The safety and use of tealights and candles

GOVERNMENT CONSUMER SAFETY RESEARCH

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Department of Trade and Industry

HOME OFFICE

Contents page

Tables

INTRODUCTION

This research project, carried out by the Consumers Association Research and Testing Centre, on the safety of nightlights* and candles was commissioned by the Department of Trade and Industry (Consumer Affairs Unit) and the Home Office (National Community Fire Safety Centre, with support from the Fire Service Research and Training Trust). The project followed concerns about increasing numbers of accidents involving candles and tealights/nightlights.

The specification for the research highlighted increasing safety concerns associated with night lights and candles and identified a need for a better understanding of how and why so many accidents are occurring. The specification also identified the need to assess what solutions or actions could be introduced to reduce the hazards associated with these products.

The aim of the research was to try to establish the relationships between numbers of accidents involving nightlights and candles, product design, consumer usage, marketing and labelling and all the complexities that these issues can bring.

A multi-disciplinary approach has been used to bring together market knowledge, product safety expertise and product familiarity, as well as using external contacts for wider research purposes. All of these are combined with a research programme conducted primarily in the UK but with additional information from other European countries and the USA.

As well as consulting candle and safety related organisations in the UK and elsewhere, others involved in the field were also consulted, including Stan Ames (independent fire consultant) and Dave Townsend (London Fire Brigade).

The London Fire Brigade has already carried out work, including research, to demonstrate that tealights can ignite and melt surfaces on which they are placed, if no holders are used. The product tests in this research aimed to build on this work to see if any particular weakness could be identified with the range of these products on the market.

* A ‘nightlight’ is a small candle in a foil container, designed to burn for eight hours. There is some confusion between this type of candle and a ‘tealight’ which is shallower and burns for around four hours. The names are sometimes incorrectly interchanged on products. For this report the term tealight is more frequently used as these products are more commonly available.

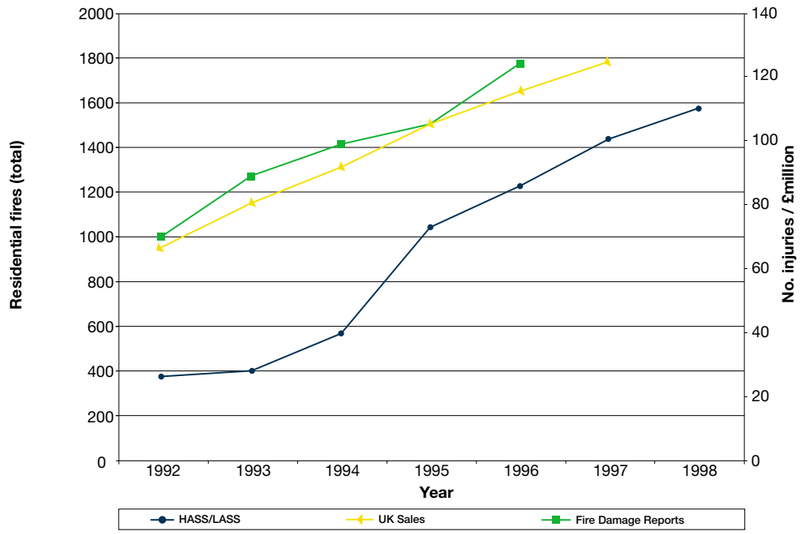
EXECUTIVE SUMMARY AND RECOMMENDATIONS

The format of this report is such that each section has its own 'summary' and 'key points', but the main findings, conclusions and recommendations for the report overall are given below.

The increase in accidents associated with candles correlates closely to the increase in the size of the candle market over recent years. The overall recommendation from this research is to increase consumer awareness to the dangers associated with using candles.

Market growth and the increase in fires and accidents

The UK candle market has increased by around 50% over the last few years. Hospital accident and fire brigade data have also seen a significant increase in a corresponding period. The graph below plots the increase in the market value of candle sales against the increase in incidents of fires or injury due to candles.



There are few lessons to learn from other countries regarding the use of candles and addressing the issue of safety.

Other European countries have traditionally used more candles than the UK but only very limited accident data is available. The preconception is that there is less of a safety problem, but in Sweden candles account for 4% of dwelling fires, similar to the 3% (recorded by fire brigades) in the UK.

The USA market seems to have grown in a similar fashion to the UK and they are also concerned about an increase in accidents – the Consumer Product Safety Commission (CPSC) is carrying out its own investigations as to the reasons and possible actions to be taken.

The best course of action

The number of fires started by candles in 1998 (1,752) is still smaller than those started by smokers' materials (6,255) and less significant when compared to chip pan fires, which accounted for 12,300 fires. But at the current rate of increase, the number of candle related fires could rise to 3,000 within the next five years.

Any action to minimise the increase in candle-related fires needs to get across a stronger safety message to consumers. Not leaving candles unattended needs to become a more ingrained instinct. If a problem arises when using a candle, even if it is due to poor positioning or to the product itself, if someone is there to deal with it in the early stages the damage and severity of injury will be reduced.

There are three main areas to target:

- *Consumers – getting the safe use message across, via labelling, point of sale material and education through the fire safety officers.*
- *The candle industry and market – collaboration between the manufacturers, distributors and retailers regarding labelling, point of sale material and maintaining product quality*
- *Media – improve the portrayal of candle use in photographs and room make overs*

The Consumer

Candle usage has become a way of life. It has evolved from more formal occasional use, to a wider, more informal pastime, including their use for atmospheric and relaxation purposes. The generation now using candles does not necessarily have the experience and knowledge once held by those who were more commonly reliant on candles for their functional purpose.

Consumers and safety

The increase in use doesn't appear to be creating a better understanding of the safety issues associated with candles.

Research into how candles are used suggests that frequent users consider themselves to be well aware of safety, but this depends upon how the candles are used. If they are used in a more informal way – more personal use; enjoying the candle directly – there seems to be more awareness of the candle. Light users are considered to be more at risk (opinion of frequent users) because they are less familiar with the product and safety issues.

The use of candles for religious and spiritual purposes accounts for only about 5% of use and the risks associated depend on the part the candle plays. To some extent there is a feeling of 'my faith will protect me', but some uses involve many people in close proximity or conversely leaving of candles unattended.

Consumer misuse

Detailed information on the accidents recorded at A&E units and limited information from news items goes some way to confirm the suspicion that accidents are often a result of candles being left unattended. The most common rooms where fires started by candles occur are living rooms and bedrooms. As well as candles left unattended when people vacate a room, falling asleep with a candle still lit appears to be a serious cause of fires.

Consumer education

Consumers need to develop a greater awareness to the dangers of using candles. The use of consistent material in the form of point of sale leaflets and product labelling is important, emphasising the risk of leaving candles unattended and the importance of extinguishing before falling asleep.

The current safety labelling scheme is possibly giving too many messages and is often given alongside other information (eg. burning time). The pictograms used are also not always ideal, often too many which are too small and so not giving the necessary information.

The aim should be to ingrain greater common sense when using candles with clear and simple messages such as 'do not leave unattended', 'keep away from flammable materials' and 'use with an appropriate holder' given more prominence on and with products.

It is also recognised that there is a role to be played by the fire safety officers in addressing consumer education in this area.

Media influence

During the course of the research it was noted that candles are frequently shown in room make-overs in media publications (eg women's and lifestyle magazines).

The amount of material depicting the use of candles inappropriately appears to far outweigh the amount with correct set-ups or containing safety information. The most common problems are candles used without holders or on heat sensitive, inappropriate surfaces and positioned too close to flammable materials.

Improving the way candles are used in photography in the media is essential, but also probably the hardest to address.

Publishers need to address the use of candles in photographed room set-ups and also encourage safety advice to be given alongside any use of candles. This could be a difficult area to challenge due to the use of 'poetic licence' when it comes to designers wanting to achieve the 'right look'. The designers and photographers are also likely to be freelance so difficult to communicate with as a group.

The publication of the results of this report itself can be used to increase awareness. A few major publishers own most consumer magazines. By highlighting the image their publications give, hopefully the message would be permeated down through their organisations. Indeed a major publisher of consumer magazines has indicated that he will include safety messages in future features.

The candle industry and market

The British Candlemakers Federation (BCF) was established about 5 years ago and members include major UK manufacturers and raw material suppliers. The Federation is a member of the European Candlemakers Federation. The latter introduced a set of safety labels that have been taken up, adapted and extended by the BCF – some members producing point of sale leaflets explaining the labelling scheme.

The British Candlemakers Federation has made a useful start in trying to make consumers aware of safety issues relating to candle use. However, evidence on the products bought and from the consumer research suggests that the labelling scheme is not as effectiveness as intended. Some inconsistency in the use of the safety symbols was noted and, where used, they are sometimes too small or the message is misleading.

Adoption of appropriate schemes or codes of practice by the Federation is useful but it must be recognised that the Federation is purely a trade group for UK candle manufacturers and suppliers. With candles becoming more widely available, increasingly other manufacturers, distributors and retailers are becoming important in the UK candle market. There needs to be better co-operation in this industry and retail network as a whole.

The current labelling scheme needs clarification and wider implementation by retailers and distributors and other non-members of the BCF, who already use the scheme.

There are various forms and styles of the labelling and safety leaflets being used and maybe this should be made more consistent in terms of what is on the product and at the point of sale. The Home Office leaflet could be used by a wider variety of retailers.

The Products

Burning tests were carried out on products from two important sectors of the market - tealights and nightlights, including increasingly popular scented and coloured ones, and examples of pillar candles with embedded material.

Tealights and nightlights

A limited number of problems were experienced from this testing - scented and coloured tealights were expected to present a risk, but in fact the only significant failure of this

product type was a white tealight. The product that failed also demonstrates the problem of confusing labelling and characteristics of this type of product. The majority of products tested were called ‘tealights’ (they are about 1.5 cm tall and burn for around 4 hours). This sample, and a similar scented version, were deeper than the other tealights. Two products called ‘nightlights’ were similar in depth to the tealights although one of them did burn almost as long as the traditional nightlight - designed to burn for up to 8 hours, through the night.

Candles with embedded material

Candles with embedded material are constructed in a variety of ways - examples include a candle with wax of a higher melting point around the edge into which the material is embedded or an internal plastic container between the outer wax, with the embedded material, and the wax that is burned.

One cheap unbranded product presented a safety risk when the embedded dried flowers and lacquered picture on the outside caught fire.

Introduction of Standards?

When considering the information from the accident records and tests carried out, there does not appear to be evidence that there are any particular ‘design’ problems contributing to accidents with candles (it is the way they are used). But as the products become more popular, market competitiveness will continue to grow with the potential introduction of new types and styles of products that do not have a tested ‘history’.

When it comes to safety, minimum standards and quality, there is little in the way of published or recognised standards. The German Candle Quality Association have produced a ‘RAL’ document for certification by manufacturers, but it is limited to the German market. The ASTM standard from the USA purely gives limited terminology for describing different types of candles.

There have more recently been discussions at the European Federation level to consider developing a quality standard, based on the RAL document.

A candle standard would be one way of defining a ‘perfect’ candle. The German RAL document goes some way to looking at the different elements of a candle. Industry co-operation between major manufacturers, suppliers and retailers has the capability of introducing something similar - a minimum standard or a code of practice (including terminology). This way, at least manufacturers have a benchmark to manufacture products to. It would also give something to measure against in the event of a case being brought against a product. During the later stages of this research the European Candle Makers Federation have shown a strong will to create a European standard for candles, but funding is a problem.

Special attention for tealights

Despite the conclusion that generally the product design probably has less to do with the causes of candle related accidents than the way they are used, tealights and nightlights are still considered to present a particular risk. The focus group participants considered them to be different from most candles – easier to use and less messy. They are perceived as safe because of their design and integral ‘holder’. This can lead to a problem of tealights being placed on inappropriate surfaces. Previous work in this area for the London Fire Brigade, particularly in relation to televisions, recommended an improvement in design to reduce the base temperature of the tealight.

From a look at the market and product tests there is still confusion and some inconsistency in the size and appropriate labelling of tealights and nightlights. *An industry standard or code of practice on what constitutes a tealight should be agreed in terms of size and burning time, possibly with the elimination of the term ‘nightlights’ altogether. The very name encourages people to leave them unattended.*

1. MARKET RESEARCH

The information in this section of the research is a result of analysis of the market in general. It includes information from market research sources, eg. Mintel, direct research in the market and from meetings with the three main UK suppliers (Bolsius, Colony and Price's). It was not possible to gain co-operation from the main specialist retailers, so the information may be considered slightly biased by the manufacturers' opinions in some areas.

Summary

The market for candles in the UK has virtually doubled in the last 5 years as their use as enhancement products expands. Candle use in the UK has now become a lifestyle rather than just a passing fad. It has moved to all rooms in the house and away from eye level to low level candles.

Women make over 95% of the purchases.

The scented candles sector has shown the most growth recently – accounting for 40% of the market - and is likely to be the major growth area over the next few years.

Candles are now sold in almost every type of retail outlet. Major supermarkets now stock a much wider range of candles and have pushed for lower priced products. Many retailers are only interested in obtaining the cheapest product, frequently sourcing poor quality products from countries such as China. However, the market has become divided with some retailers still more concerned with quality rather than price.

There are over 100 candle manufacturers/distributors in the UK, ranging from the major automated manufacturing companies like Price's to the very small cottage industry businesses producing hand made candles on a very small scale. Most of the major UK manufacturers are members of the British Candlemakers Federation.

Imports have been increasing at a similar rate to overall sales and now account for approximately 30% of UK sales.

Although Christmas is still a peak time for candle sales, this seasonality is now gradually disappearing as consumers are buying candles all year round.

Mintel estimate that candles used for religious celebrations, eg Christian, Jewish, Hindu, account for only 2-5% of the market.

The market for candles in Europe is much larger than in the UK - overall usage is at least 4-5 times higher in Europe. The Germans use 10 times as many candles as the UK. In Scandinavia they use 20 times more.

The European market is very different to that in the UK - concentrating on standard candles and tealights rather than decorative or scented candles.

The US market has shown similar growth and trends to the market in the UK. The scented candle market is the fastest growth area currently.

Key points

The candle market is diverse and competitive, including some main UK manufacturers but also various smaller companies. The retail market is also extensive with candles available from an array of outlets.

This would make the market difficult to monitor or regulate. The British Candlemakers Federation is a trade organisation that offers some potential for co-operation, but a number of smaller manufacturers are not members, neither are the numerous importers/distributors nor the major retailers who source stock directly from abroad.

1.1 UK Market

1.1.1 Size and Structure

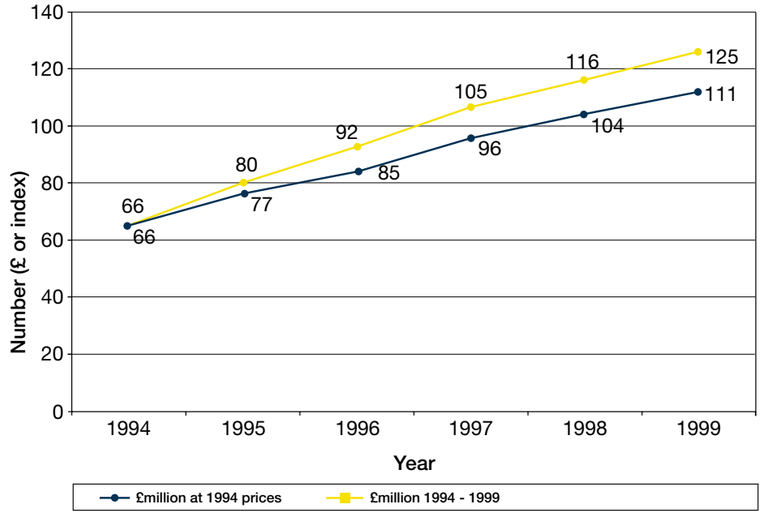
It is estimated that 1 billion candles are burnt in the UK every year.

Retail sales of candles in the UK are thought to be worth in excess of £120m, with exports accounting for 15-20% and imports accounting for approximately 25-30%. Over the last 5 years the value of imports has increased by approximately 90%, following the trend in the market generally. In 1999 28% of imports originated from EC countries, 28% from China, 16% from Hong Kong and 12% from USA. It is often difficult to identify imported candles as many do not include country of origin on the packaging.

The market for candles in the UK has virtually doubled in the last 5 years as their use as enhancement products expands.

Chart 1, below, shows the increase in the value of the candle market over recent years – volume figures are not available.

Chart 1: Increase in the UK retail sales for candles (by value)



Candle usage in the UK has now become a lifestyle rather than just a passing fad. There is now a huge range of different products available to consumers and many more different outlets stocking candles. The emergence of specialist candle retailers eg Wax Lyrical, Angelic and the recent Price's outlet shops, has aided this process.

Table 1, below, shows the estimated breakdown of the candle market from the latest Mintel report on the candles market, published in April 1999.

Table 1: Candle market share by type

Candle type		1994 %	1998 %	% Change
Enhancement	unscented	40	38	+69
	scented	22	27	+107
Functional	tea lights	24	21	+50
	emergency	11	4	-29
Air Care		3	10	+500

The top three manufacturers in this industry all agree that the market sector showing the most growth recently is scented candles (particularly the small room scenters or votives as they are sometimes called) and scented tealights. This is likely to be the major growth area over the next few years. The Air Care sector is another major growth area in the scented candle sector, where the two major companies, Reckitt Benckiser and SC Johnson have launched Glade and Haze branded candle products into the multiple grocery trade. Overall,

scented candles now account for around 40% of the market.

Prior to the early 1990s the candle market was dominated by dinner candles, used almost exclusively in the dining room. Since then, candle usage has moved to all rooms in the house and away from eye level to low level candles.

Women make over 95% of purchases

1.1.2 Distribution

Candles are now sold in almost every type of retail outlet (see table 2). In the last few years the market has been fuelled by the major supermarkets who are now stocking a much wider range of candles (previously only the standard household candles and tealights), and have pushed for lower priced products. Many retailers are only interested in obtaining the cheapest product, and will frequently source "poor quality" products from countries such as China. There are some retailers, however, who are still more concerned with quality rather than price and the market has become divided.

The specialist candle retail outlets have also helped expand the market. Wax Lyrical now have 50 branches nation-wide, Angelic* had about 14 nation-wide and Naked Flame have 9 outlets in the Midlands and South East. Price's Patent Candle Company has opened 14 Price's candle shops in factory outlet malls.

Table 2: Candle market - retail distribution

	% share of the market	
	1994	1998
Variety/department stores	27	25
Gift shops	20	20
Grocery multiples	11	14
Specialist candle outlets	11	13
DIY multiples	8	10
Others	24	18

Totals may not equal 100 due to rounding

1.1.3 Manufacturers

There are over 100 candle manufacturers/distributors in the UK, ranging from the major automated manufacturing companies like Price's to the very small cottage industry businesses producing hand made candles on a very small scale. Many of the UK manufacturers also import products that they cannot manufacture, either for reasons of capacity or because they are not able to produce particular types of candle, eg decorative candles (most of these come in from China). A number of the major European

* Angelic have ceased trading since the research was carried out.

manufacturers also have sales and marketing operations in the UK - imports from EC countries account for 10-15% of UK retail sales.

The top three suppliers in the UK are Price's Patent Candle Company Ltd, Colony Gift Corporation Ltd and Bolsius (UK) Ltd.

Colony claim to be the number one UK manufacturer with a turnover of approximately £15m. Although Price's claim £20m, putting them at the top of the market in terms of value, a greater proportion of their output is higher priced candle accessories. Bolsius have a turnover of £8m. Bolsius, however have recently closed their UK manufacturing plants and are rationalising their product range in the UK, aligning it with their European range which comprises only the mass produced basic candles and tealights. This will mean that their turnover in UK is likely to halve over the next year.

1.1.4 Seasonality

In the past the candles market was highly seasonal, with a peak at Christmas time accounting for 80% of sales. Although Christmas is still a peak time for candle sales, this seasonality is now gradually disappearing as consumers are buying candles all year round and the manufacturers are marketing candles for different seasons/events throughout the year. Mintel estimate that candles used for religious celebrations, eg Christian, Jewish, Hindu, account for only 2-5% of the market.

1.1.5 Types of Candles

There are many different types of candle available on the UK market (far more than in Europe where the market is largely for standard ordinary candles and tealights):

Dinner candles also known as tapered candles - still very popular (30% according to Bolsius). Need to be placed in suitable holders.

Pillar candles - basic cream coloured candles that need to be placed on or in suitable holders.

*Church candle*s - basically pillar candles, but must include some beeswax.

Room scenters, also known as votives, - small scented coloured candles for use in small containers. (These products liquefy so must be placed in a suitable container).

Tealights - small white or coloured or scented candles in metal containers. Scented tea lights should not be used under oil burners. Burn for 2-4 hours.

Nightlights - only made by Price's. Larger than most tealights. Burn for up to 8 hours. Should not be used under oil burners or in enclosed containers. Many tealights are mislabelled nightlights. Bolsius still label their tealights as nightlights, they claim this is the generic term in the UK for tealights.

Floating candles - manufacturers believe these are the safest type of candle.

Gel candles - these are thought (by traditional candle manufacturers) to be one of the most dangerous types of candles available in the UK. The British Candlemakers Federation do not recognise gel candles as candles because the wick does not burn like a normal candle wick. However, according to one of the major suppliers the physical mechanisms of burning is not different to other candles and the gel has a flash point comparable to that of wax candles. Because they are a relatively new product on the market there have been some concerns about their safety. There have also been several recalls recently (Tesco, Glade in USA). Potential suggested safety issues include children putting fingers into attractive clear gel and the possibility of dust sticking to the gel acting as a secondary wick during burning.

Decorative candles - different shapes, may be embedded with flowers, shells etc. Mostly made in the Far East. Some have thick coatings of lacquer which can adversely affect the burning characteristics. Outer coatings can be set alight if the candle burns too strongly.

Glass filled air care products – candles that come in their own glass container. Currently a small part of the market but the recent rate of increase in market share would suggest that they will become more popular. Some concern that their usage may be concentrated in bathrooms because of their branding image (eg Glade and Haze).

1.1.6 Religious Festivals

Apart from Christmas, Easter is very important for candle sales and also Diwali (for the Hindu religion). Bolsius sell a lot of household candles to cash and carry groups for this festival and expect the supermarkets to expand into this area soon. There are also a number of Jewish festivals which involve the use of candles. Masons also use a lot of candles throughout the year. Muslims tend not to use candles at all.

			(per household)
Jewish	Passover	April	2 candles normally
	Jewish New Year	September	2 candles
	Yom Kippur	Sept/Oct	2 ordinary candles, plus 1 memorial Candle (very thick candle, burns for 25 hours)
	Feast of Tabernacles	October	2 candles
	Chanucah	December	candles lit for 8 days - small candles, burn for 20 mins.
Hindu	Diwali	Oct/Nov	Festival of light - many candles used

1.2 European Market

The market for candles in the rest of Europe is much larger than in the UK - overall usage is at least 4-5 times higher in other parts of Europe. Germans use 10 times as many candles as the UK. In Scandinavia they use 20 times more. But the market is very different to that in the UK - concentrating on standard candles and tealights rather than decorative or scented candles. UK is the only country which sells tealights in packs smaller than 50 or 100; in other parts of Europe they are purchased as a weekly commodity. Candles have been a traditional part of everyday life for many years. People know how to use them. The introduction of scented candles is just starting - through Giess, the largest European manufacturer of candles, with the help of Colony. The trend in the UK will move into the rest of Europe, although European manufacturers are geared to mass production of standard candles or tealights and do not have the flexibility to change production lines quickly and easily as in the UK plants.

In Netherlands and Germany sales of candles peak in February for the Blessing of the Candles ceremony.

Continental tealights tend to be shallower than UK ones.

1.3 USA Market

Candle sales in the USA are estimated at $2.3 billion (£1.5billion). The US market has shown similar growth and trends to the market in the UK. Since the early 90s the industry has averaged an annual growth rate of 10-15%; more recently, this growth rate has doubled. There are over 200 commercial manufacturers of candles and many small craft producers. Approximately 70% of USA households use candles and 96% of purchases are made by women. The scented candle market is the fastest growth area currently.

2. CANDLE POPULARITY AND MEDIA INFLUENCE

Summary

The increased popularity of candles is reflected in the use of candles in media lifestyle articles.

Although detailed research into this area of candle usage was not within the original remit of the research, observation of the market and aspects that influence consumer use shows a range of examples. Often the candle use is inappropriate in the room sets photographed. They are shown without suitable holders and sometimes in vulnerable positions from a safety point of view. There is often little or no safety advice given.

Key points

The printed media – particularly lifestyle magazines - would appear to be an important target in improving the image of candle use. The manufacturers are not without fault though, and the message of safe use needs to be addressed across the board.

During the course of the research, the illustration of candles used in the media, press and other publications was often worrying from a safety point of view.

2.1 Consumer Press

The research was carried out prior to Christmas so this explains the abundance of candles in lifestyle pictures. Often candles are used inappropriately in room sets, particularly the pillar type candles that are used in a group and often without holders. Christmas room sets in particular showed candles used among flammable materials such as Christmas foliage.

Bathroom pictures appearing in magazines are increasingly being photographed with candles as accessories. For example, the "Living etc" magazine (March 2000 issue) had a free small square four-wicked candle on the cover. Inside a number of these candles are shown placed on a bathroom floor, without any holders.

Only very occasionally was safety advice given alongside the articles using candles.

As a follow up to this research project, additional tests were carried out using candles in arrangements or set ups as suggested in some publications. The pictures below show the result of burning a typical decorative mantelpiece arrangement.

In addition to the danger of foliage and decorations catching fire, the use of candles grouped in this way produces a lot of heat that speeds up the burning of all the candles surrounding. In this example the arrangement was left to burn with no intervention. In the domestic environment someone trying to put out an arrangement could create a greater problem.

The example above illustrates the effect of using novelty shaped candles without appropriate holders or on an inappropriate surface. The candles are small multi-wicked candles.

Effect of burning a typical festive arrangement.

2.2 Manufacturers' brochures

Although not directly presented to consumers, we also noticed that manufacturers' brochures often depicted set ups with many lit candles, not necessarily used with holders and placed in inappropriate arrangements.

If retailers are using the brochures as references for the candles they sell, the message of safe use is not being correctly passed on to those who are at the interface with consumers.

3. SAFETY AND LABELLING

Summary

The British Candlemakers Federation (BCF) prides itself in pushing forward with safety advice and a labelling scheme. The pictograms that they have adopted to provide information on safe use were found on some of the candles purchased as part of this research, but there was some inconsistency across the ranges of candles and from different manufacturers. The very nature of the product, however, means that often the labelling has to be very small, and removable.

The use of the BCF labelling scheme is not mandatory. Some manufacturers have taken it up more than others. Colony provides a chart explaining what the pictograms mean, for displaying with their range of products. Similar leaflets are sometimes available.

Point of sale safety advice is also generally lacking – beyond the labels on the packets. Most retailers do not present safety advice.

Key points

Moves by manufacturers to encourage safe use is welcomed (and in their interest), but the current scheme is not necessarily addressing the issue fully or effectively.

There is also very limited advice passed on at the point of sale – this would seem to be a key area to target in making consumers more aware of safe use.

The UK candle industry claims that the UK has the highest standards in Europe and is the main player in the push for quality and safety.

However, the extent of safety and appropriate use labelling, provided with a candle - either on the product or at the point of sale - varies greatly.

3.1 The British Candlemakers Federation

The British Candlemakers Federation (BCF) - set up in 1995 - has 14 full members who are candle manufacturers in the UK only. There are a further 11 Associate members who supply candle making materials, but they are not likely to be specifically interested in safety or standardisation. The BCF is also a member of the European Candlemakers Federation (ECF).

In 1996 the British Candlemakers Federation, in conjunction with the European Candlemakers Federation, began promoting safe candle use by producing a safety code. This included symbols/pictograms and suitable wording. The BCF produced their own leaflet (see below) and manufacturers and some retailers have also produced their own similar leaflets.

The BCF has extended the set of symbols originally produced and approved by the European Candlemakers Federation, as they did not feel the ECF covered all aspects of safety. Manufacturers are using some or all of these symbols on their packaging, depending upon the size and type of candle, and the available space. But there is no mandatory requirement to follow the BCF guidelines.

Members of the BCF have representatives on a technical committee at the European level in order to develop a quality standard based on the RAL document. But the process is rather slow due to the liaison required with other various members across Europe. (see page 53).

3.2 Evidence of labelling and advice in the UK

During the course of the research, and through the purchasing of samples for testing, we have been able to look for, document and informally assess the labelling and product information regarding safety and use of candles.

While the labelling and symbols offered by the British Candlemakers Federation is welcomed, the symbols scheme used are often very small and difficult for consumers to understand unless they are particularly familiar with the scheme and the symbols, or there are supporting explanations. The focus groups (see section 4) had difficulty understanding some of the symbols without any supporting text.

Of the candles purchased for testing and use with the focus groups, about a half of the tealights had some form of pictograms. However, the size, contrast and general clarity varied. There was also a lack of consistency, for example the pictograms on the Price's Dinner Candles were different to those on their nightlights but both were trying to give the same message. Other products from the same brand did not have pictograms (just text).

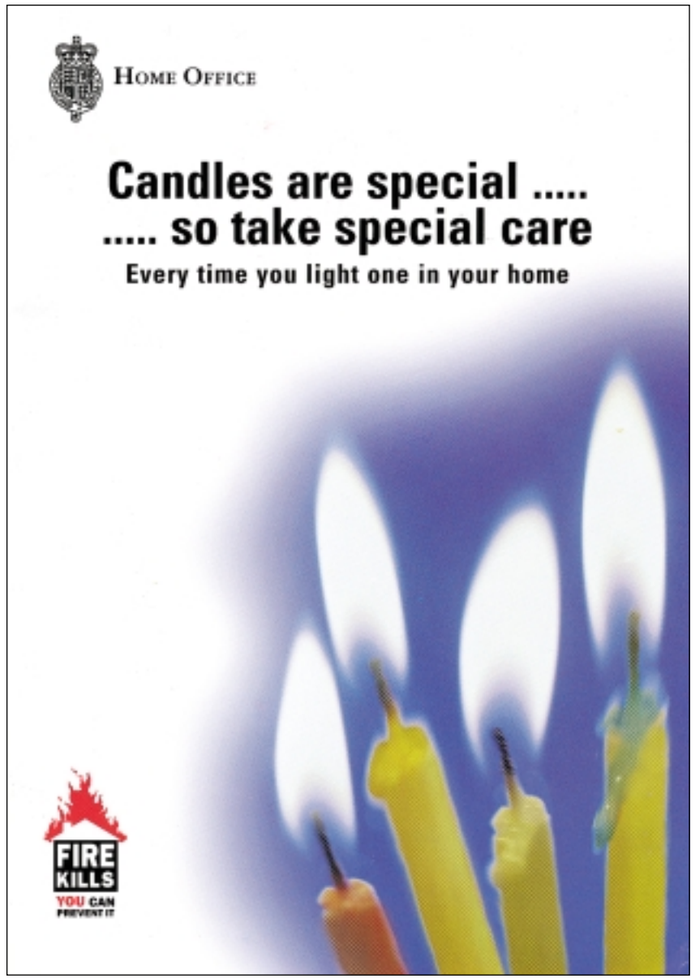
Other forms of written safety advice varied in frequency and clarity. For larger candles, advice was sometimes found on a label stuck to the candle (often the base), but the writing may be so small and dense that the consumer is not able to or encouraged to read it. Some labels were stuck to the candle itself and should be removed prior to use.

Many candles, particularly imported products, had no labels. Evidence was also found of candle labels giving inappropriate information, eg. a pillar candle with a small label designed for use on a floating candle.

Tealights are often sold in bulk packets with little or no safety information - it is also easily disregarded once the candles are removed from the packaging.

Point-of-sale safety advice was also rare. Colony has reproduced a copy of the BCF scheme on a card to be displayed with their candles, and a leaflet copy is sometimes available. Specialist retailers such as Angelic and Wax Lyrical gave limited advice. Angelic has some information in the form of comments relating to particular candles on display. At the Wax Lyrical outlet visited a leaflet was available, but it had to be specifically asked for. It is a general product information leaflet but includes safety advice and pictograms. Price's now have a number of retail outlets and, at the outlet visited, there were leaflets on the counter for shoppers to take.

The Home Office produced a leaflet highlighting candle safety (see below). It was particularly appropriate for distribution before Christmas and New Year celebrations. For consistency, this leaflet or a revised version could be used as point of sale material for any retailer.



Front of Home Office Leaflet

Reverse of Home Office Leaflet

3.3 Other safety information from manufacturers

Manufacturers do not generally make any recommendations regarding types of holders for the different types of candle. Indeed, in many of the manufacturers' brochures burning candles are depicted with no holders at all, sitting directly on surfaces.

The major problem with candles is being left unattended. Customer complaint levels among the major manufacturers are generally very low, with the majority of problems being with tealights and oil burners.

The main cause of fires where the candle is at fault is due to flashing (where the whole surface of the wax catches fire) - either caused by secondary wicks (which leads to overheating of the wax) or a wax which catches fire at a relatively low temperature (low flash-point). Tealights can get a build-up of soot on the end of the wick and when this falls off it can form a secondary wick. Embedded material or discarded matches in the candle, can also form a secondary wick.

Scented candles have their own set of problems. Scented candles have to liquefy to emit the fragrance and this can result in the wick falling over. The perfumes used may alter the burning characteristics of the wax, sometimes lowering the flash-point of the wax. Over fragranced candles can have very low flash-points. Scented tea lights should never be used with oil burners.

Candles with embedded decorative materials, such as dried flowers, can also be dangerous because of the possibility of the inlaid materials catching fire. Bolsius do not manufacture any of this type of candle (partly because the market for these is only in the UK and this is not large enough to warrant manufacture in their mass production facilities). Colony has recently launched a range made from dual melt wax - the outer layer remains solid longer and protects the embedded material from burning.

4. CONSUMER USAGE (FOCUS GROUPS AND INTERVIEWS)

The aim of this element of the research was to assess candle users' behaviour and attitudes, and evaluate whether and how behaviour could be changed by awareness campaigns. The qualitative research was carried out among members of the population who regularly use candles for recreational and/or religious reasons.

Summary

Growth in candle usage was principally attributed to increasing choice and quality. There was a perceived move towards using candles for relaxation and self-awareness – as part of personal rituals and personal space (‘chilling-out’). In practical terms this creates a shift in candle image and associations from an old fashioned commodity to an aesthetic lifestyle item.

The calm tranquillity and naturalness of the naked flame provides a symbolic aspect to candles not achieved with other alternative light sources such as paraffin lamps, which have a purely functional role. These symbolic aspects are seen as important for all types of frequent users from very structured, formal religious rituals to personal use.

A wide range of products is being used, candle users have a very wide repertoire, rather than one or two favourites.

Nightlights/tealights are probably the most used product. They are considered to be good value for money, easy to use and functional – more of a commodity when compared to other candles used. They are also seen as being safer than other candles. Few people were aware of differences in the product names "tealight" and "nightlight". An associated trend appears to be growth in the use of oil burners. Nearly half of the participants in the focus groups had used these for a range of reasons.

Candles that were avoided included floating candles and very elaborate candles (eg multi-wick). Both types did not necessarily burn well so were poor value. Cheap candles are avoided because of experience of poor burning qualities (smoky, irregular burning etc).

Candles are normally lit with household matches and simply blown out (as opposed to using a snuffer).

They are most likely to be used in the living room and dining room. A significant number of the sample used candles in the bedroom, although they were in the minority and often used in oil burners to aid sleep and general relaxation.

When regarding safety, it must be remembered that the focus group members were fairly mature and used candles regularly; therefore they were probably more informed than general users. Consequently, while we have gained a rich picture of usage and habits, and have identified where the main risks lie, we must be careful how we apply the findings to those who are less frequent users. Infrequent users may present a higher risk.

Attitudes towards safety were not always easy to access directly and not a priority issue for most candle users, especially in comparison with other domestic products. Safety oriented

habits were often ingrained rather than particularly considered behaviour. Caution and thought is normally exercised and there is a natural level of awareness where naked flames are concerned - but the users are comfortable applying basic common sense.

The functional and social use probably presents the greatest safety risk (tend to be light users) – but these users are more likely to respond to change than the heavier users (used for more individual relaxation or religious purposes).

No user typology or consumer segment was identified as being a particular high risk. However, some have a much more laissez faire attitude than others and different consumer types bring with them different qualities of risk. Religious users generally show more inclination to leave candles unattended.

The focus groups thought that infrequent users may be less candle wise, and the younger and more experimental (by virtue of the numbers of candles and more informal usage) may take more risks. People using candles for social occasions only (often in association with drinking alcohol) may present a risk.

Very few of the participants read the labels on candles or tealights regularly.

When looking at the packaging the focus groups found the warnings were written too small to attract the eye or be read easily.

Key points

Consumers who are using candles frequently tend to have quite extensive knowledge.
Most respondents feel they are doing enough even if in reality their habits have risk attached.

None were familiar with the symbol system, but most felt it could play a useful role.

It is not clear whether the greater risk lies with heavy or light users. Whilst heavy users use them in a wider range of places and may have some bad habits, they are also more familiar with using candles. Light users may use candles more conventionally, but lack of awareness may bring different risks.

Consumers very rarely look for safety information on candles/candle packaging or at point of sale.

The symbolic aspect of candles may colour the way that people respond to any calls to modify their behaviour. The more intense the belief or sense of pleasure associated with a particular usage the more resistant they will be to altering this.

A major component of the challenge is to resensitise an essentially complacent audience.

It must be remembered that the group used were frequent users and there may be capacity for greater safety awareness and thinking for the population as a whole

4.1 Consumer Usage Research Methodology

A series of focus groups and in-depth interviews were carried out to investigate how people use candles and their awareness of safety and labelling.

For this qualitative research, the focus groups included people who frequently used candles for their aesthetic qualities. In-depth interviews were used to target candle usage specifically among religious or other belief systems.

The one group of the population excluded from the focus groups were those using candles through necessity (those without power for lighting). This group is likely to be a very difficult group to identify and to obtain any useful information from. For this reason it was excluded from the programme of focus groups. According to Ofgem the number of customers disconnected has fallen sharply since 1991 when a code of practice was introduced for supply companies dealing with customers experiencing difficulty paying their bills. In 1994/5 the total number of disconnections was 1,083 – this has fallen to 373 in 1998/9. These figures suggests that this group of people do not make up a significant proportion of the population as a whole, and therefore the effort in trying to survey this group would be disproportionate to the value of the information obtained.

4.1.1 Household focus groups

Three focus groups, each with eight participants were held in order to ensure robustness to the design and allow for more confidence in findings. It also meant groups had smaller age ranges, which were more manageable in terms of group dynamics.

Requirements of attendees to the household focus groups.

Criteria Shared by all Respondents:

- All using candles
- All between 24 and 65 years old
- Mixed sex groups
- Mix of frequency of candle and nightlight/tealight usage (but majority more than once per month) At least 3 in each group to use night lights/tea lights
- Range of usage occasions and parts of the home used in
- Belief system/religion noted but no quota.

Table 3: Focus groups – participant characteristics and location

Group 1	Group 2	Group 3
South (London Suburban) – Southgate	Midlands – Sutton Coldfield	South East (Outside London) – Winchester
Mixed sex	Mixed sex	Mixed sex
24 – 35 years	36 – 45 years	46 – 65 years
Half with children	All with children	Half with children
At least 2 working in semi – unskilled	Range of ages	At least 3 with teenage children
capacity	2 at least with children aged 0-5	

4.1.2 Religious/Belief Systems Interviews

Eight in-depth interviews were used to gain a full and detailed understanding of the role and practice of candle usage in what is possibly a very individual and personal context. This also avoided the possible tensions between respondents holding different belief systems, likely to make a group format untenable. The religions covered included Jewish, Catholics, Buddhists, Pagans (Wicca), Hindus, Yogis and Reiki practitioners. All practice their faith/belief system regularly (at least once per week). During the recruitment it was discovered that the Muslims do not use candles for religious purposes. The interviews were conducted in the South and Midlands.

4.1.3 Topic Guides for the focus groups and interviews

The main aspects covered in the discussions were – to summarise:

- Consumer usage behaviour and motivations – discussing habits, types of candles used, preferred designs and where they are used.
- Purchase process – where candles are bought, what they look for and why they are bought eg. as gifts.
- Safety issues – had they ever had any accidents, what risks are associated with candles and what precautions are taken.
- Packaging and labelling - information they expect, awareness of safety instructions/symbols followed by discussion with examples of labelling provided.

The religious/belief systems interviews covered the same areas with the discussion about use, exploring ceremonial use and whether this affects the purchasing, behaviour and attention to candles.

4.2 Focus Group Findings

- Most of the sample were using candles fairly frequently and very light users may present a slightly different risk profile to this group. However, there was a sufficient range in frequency of use and general enthusiasm about candles for a number of observations to be made.
- Most of the sample were using candles and tealights regularly, if not frequently. They generally liked using them although degrees of enthusiasm varied considerably. Men appeared to be as enthusiastic as women, although women appeared more comfortable expressing their motivations for usage.

4.2.1 General Attitudes

Some candles were bought for purely decorative purposes and would not ever be lit under normal circumstances.

Often candles would play a number of roles within a household from formal (e.g. dinner party) through to personal/intimate usage. In many cases candlelight would be the only light source in a room.

All the participants recognised a resurgence in candle usage. They attributed it to a number of factors:

- Proliferation of good outlets
- Lifestyle changes (more interest in the self, relaxation and the spiritual)
- Much greater choice of product
- Replaced the fire as the focal point of the room.

4.2.2 Types used

A number of types or categories of candle appeared to transcend taste barriers and have very wide appeal.

Nightlight/Tealights were probably the most used category. Respondents were familiar with both names, although few could differentiate between them. Most knew them as nightlights, but the term tealight was used by significant numbers.

Nightlights and tealights were viewed as different from most candles - very much a commodity (cheap, easy to use, no mess, long lasting and versatile).

Church Candles were another popular type, which had formal, informal and religious functions.

Scented Candles. A surprisingly broad audience, but with a slight female bias. They were particularly popular for taking away the smell of tobacco.

There appeared to be a shift in taste away from classic, slim dinner candle design toward more chunky church candles. This is because they are more stable and less formal (less old fashioned). There is also an apparent trend towards very broad based candles (possibly with multiple wicks).

Almost half of the total sample owned and regularly used oil burners for either general room scenting, aromatherapy, or medicinally for the children. Some bias toward the younger, but many older respondents were also using them.

Candles that were avoided - to a large degree this was a matter of personal taste, but there were some interesting common themes:

- Floating candles - lovely effect but considered poor value for money (burn out quickly), they may spit if water is absorbed by the wick and were generally considered to be fiddly to use.
- Very elaborate candles (e.g. 3 wick) which do not always burn well and may collapse.

4.2.3 Motivation and use

As natural sources of naked light candles and nightlights/tealights are rich in symbolic as well as aesthetic values. It is this side of them that attracted people to use them, whether it be religious/belief system driven or more standard domestic. Users drew from the symbolism of both the candle and the naked flame.

Motives for using candles can be described along a continuum from functional (use in power cuts) through more social and intimate use, to personal use (relaxation and time-out use) and, at the other end, religious ritual use.

The functional and social use probably present the greatest safety risks, but the users are likely to be receptive to change, compared to the more personal or religious uses (which offer less risk but users will be more resistant to change).

Differences in attitude due to gender were evident to some extent. Women tend to drive the purchase and tend to prefer more delicate and scented candles. Men show less knowledge but also less emotional motivation. They still have preferences (usually plain and chunky).

4.2.4 Frequency of Usage

Heavier Users (using candles/nightlights/tealights several times a week or more)

Consumers who are using candles this frequently tend to have quite extensive knowledge. They are lighting them more frequently, but also more are lit at one time. They probably have a wider repertoire, but also more fixed ideas/tastes. Their choice is likely to be more discerning altogether (avoiding cheap candles).

Lighter Users

They do not have the knowledge of heavier users. They are probably using candles in a smaller range of occasion types, and this may be confined to more formal use.

It is not clear whether the greater risk lies with heavy or light users. Whilst heavy users use them in a wider range of places and may have some bad habits, they also know candles better. Light users may use candles more conventionally, but lack of awareness may bring different risks.

4.2.5 Purchasing

Candles have changed from a commodity to a lifestyle, even luxury product. But, the process for nightlights/tealights appears rather different. They are seen essentially still as a commodity and tend to be purchased in bulk.

A high proportion of the participants in the focus group (normally the heavier users) avoided cheaper candles (this backs up information provided by Bolsius). They were not good value as they burn too fast, gave a smoky flame, irregular burn and had a greater potential for spillage or starting a fire.

The lighter users often had not experienced problems with cheap candles so were happy to buy them.

A wide range of outlets from supermarkets to gift shops and garden centres were used and preferences appeared to be influenced by age and usage levels of candles.

When it came to labels and package information candles are considered very simple both to buy and use so the role of labels was seen as very limited. It was felt that most consumers simply do not need any verbal/textual information.

4.2.6 Usage and Habits

Usually candles were lit using household matches. But they were put out in a number of ways and ritualistic usage did dictate the method in some cases (see religious and belief system usage).

The majority, by a small margin, simply blew candles out because it is the simplest way, was natural and had more symbolism than snuffing.

A significant number pinched the candles or used a snuffer. Snuffers appeared to be more acceptable amongst older people who were clear about their advantages. Younger respondents were quite resistant to snuffers which they felt were somewhat pretentious and prissy (formal, old fashioned and everything that a candle should not be). In addition they could not understand the benefits of using one.

4.2.7 Holders

These were viewed as a central and often integral part of the candle/tealight etc.

The consumers were also clear of the safety role holders play and they appeared to take this aspect of their candle usage seriously.

Most used what they termed ‘proper holders’. By this they meant holders specifically designed for candles. Generally respondents assumed these holders were perfectly safe.

A minority had experienced problems with holders such as glass or ceramic holders

cracking, poor fit with the candle, inadequate heat dissipation/insulation leading to damage of a surface and wall mountings (damage to décor and dripping wax).

4.2.8 Placement and location

Where the candles were placed was normally driven most by aesthetic considerations – getting the right effect/ mood. However, placement is at least informed by safety requirements also.

The most commonly used surfaces were:

- Fire hearth
- Mantelpiece
- Coffee tables
- Dining table
- Window sill
- Other hard furniture

The number of rooms in which candles were used ranged considerably and the more enthusiastic, heavier users tended to use candles in more rooms, but the living room and dining room are the main ones.

Use in the bathroom was a particular question because of concerns about the use of candles in this room. Whilst consumers do not see safety as an important issue with using candles in the bathroom they acknowledge there may be some risks (small room, clothes around, easy to knock over). However none were concerned about placing candles on the bath regardless of the material it was constructed of.

A significant number of this sample used candles in the bedroom, although they were in the minority and often used in oil burners to aid sleep and general relaxation. All recognised the risks here to be greater than in other rooms including presence of flammable materials, a smaller space with less suitable surfaces so potential for knocking over, and a high likelihood of falling asleep.

4.2.9 Safety

Attitudes towards safety were not always easy to assess directly. Safety oriented habits were often ingrained (application of 'common sense') rather than particularly considered behaviour.

All respondents accepted there are potential risks with any naked flame and this is likely to be at least part of the attraction. All could identify especially hazardous usage occasions or placement and many could also recount accidents (either happening to them or others).

Respondents were often surprised by news of the increase in candle related accidents, but on consideration attributed this to the clear increase in candle usage generally. They also felt that the highest risk would be amongst the less experienced and less mature people.

In terms of different types of candles and the rooms they are used in, tealights were seen as the lowest risk followed by normal candles and holders. Candles with the greatest perceived risks were cheap and home-made. The dining room and living room were considered to be the safest rooms to use candles, with bedrooms and hallways seen as the most risky.

4.2.10 Nightlights, Tealights and Oil Burners

Respondents consistently separated nightlights and tealights, and the associated oil burning paraphernalia, from normal candles. As a result they tended to apply different rules concerning usage. Nightlights and tealights were viewed as much safer. They are in a sealed container so did not spill, their small size meant they are more stable and only had a small flame, and it is safe to allow them to burn out.

Oil burner risks were touched upon, but they seem to be very much overlooked. Long term usage is encouraged by the equipment – they can be set up and forgotten (2 – 8 hours not unusual). Their specific pseudo-medicinal uses (e.g. decongestant in children's room) also serves to minimise perceived risks.

4.2.11 Labels, Warnings and Instructions Explored

Very few of the participants read the labels on candles or tealights regularly. Those who did were normally looking for information about the candle's features, not safety information.

Respondents expected there to be safety information on the packaging or the candles and most could predict quite accurately what kind of safety information would be included by virtue of applied common sense. Some were familiar with the symbol system, but most felt it could play a useful role.

A very small minority remembered point of sale safety displays but none could recall the content.

4.2.12 General comments on example packs and labels

A number of universal themes emerged:

- Warning writing usually too small to attract the eye or be read easily.
- Warnings/safety information may be mixed in with more general information about the candle. Impact of specific safety information is increased when it is kept separate.
- The lack of an industry standard message or symbol system was surprising for many.
- They were especially surprised by what they saw as inconsistencies (e.g. the snuffer versus blowing out instruction).
- A more overt approach like that adopted on cigarette packs may be effective.

Overall, respondents were fairly unimpressed, especially by the recessive style and tone of the information. Some interpreted this as rather half hearted on the behalf of the manufacturers.

4.3 Religious Usage Findings

All the sample practised shared ceremonies and rituals and consequently had a good idea of how others practised their faith.

However, it must be emphasised that the individual practise of one's religion is very personal (especially in the home) and the choice of which festivals and rituals to observe will differ. These interviews must be viewed as snap shots of the specific religions/belief systems which are most useful in understanding the general approach to ritual and candles.

Lighting and extinguishing of the candle/tealight may, but does not always, have greater significance than in the case of normal domestic usage. Blowing out was often the preferred method of extinguishing the candle/nightlight/tealight. Across most belief systems this is symbolic of saying farewell to the light and pushing positive wishes onto a new recipient, whereas snuffing is a more final and brutal method.

Most, but not all of the belief system candle/tealight users were also regular domestic users. For this majority the two purchases were fundamentally the same.

It is rare that the religion/belief system is very prescriptive about the type of candles to be used. Most selections come down to the individual's interpretation of what is appropriate but tended to lean towards plain designs and colours.

In some aspects, religious/belief system usage has less risk attached than normal usage. The users are usually in a very controlled, aware state of mind, it is mainly personal usage (less people milling around) and less likelihood generally of being knocked over.

However, in the same way as was observed with the more ingrained personal rituals, good and bad habits are difficult to change, especially with the more formal religions. The use is seen as dictated/prescribed by a higher being, there is a faith in the god(s) to protect the individual and there is deeply ingrained behaviour (potential risks minimised by repeatedly taking them).

4.4 Additional Consumer Behaviour Research

Fire Safety Attitudes and Behaviour Monitor – 1998

The findings regarding candle related fires in this Home Office report supports some of the findings from the focus group work commissioned for this research.

Of all the adults questioned, a fifth used candles in the last two weeks. A third claimed never to use candles.

When prevention of fires was discussed, the majority of people suggested actions they took, including ensuring candles were securely held and keeping away from flammable materials. About a third mentioned not leaving candles unattended, and a quarter stated that they ensured a candle is extinguished before going to bed or going out.

On this basis there is still some capacity to extend the safety message to a wider population.

5. ACCIDENT STATISTICS

The aim of this element of the research was to analyse the increase in candle related accidents and injuries in the UK. To determine what the main factors are - is it the candles or the way they are being used - and to make some comparison with other countries in order to assess if the UK is typical or if there are particular reasons for the increase in accidents in the UK.

Summary

There are two main types of data available for fire statistics. Hospital data records attenders to A&E departments. Fire brigade statistics record the number of call outs by this emergency service. Both forms are useful, but the fire brigade data probably gives more comparable data when comparing year on year or with other countries.

Accident data from UK hospital A&E units (HASS and LASS) estimates that there were 1,708 reported injuries due to candles, candlewax or candlesticks (1997).

There has been a marked increase in this cause of injury in recent years, particularly from candles and candlewax (from around 20 in early 1990's to 78 in 1998 - HASS recorded actual injuries).

National estimates give a figure of 10,505 injuries from candle related accidents.

The main causes of injury are burns – hot wax (26%) and flames (39%) – and lacerations (12%). Smoke inhalation from fires started by candles resulted in 16% of visits to A&E units.

UK fire brigades reported 1,758 fires, started by candles, causing 11 fatal and 772 non-fatal injuries (1998). This is 3% of all dwelling fires, and compares with 794 for matches and 4,781 for other smoker materials. Chip pan fires – the target of improved safety campaigns - still accounted for 23% of accidental fires in dwellings.

The number of deaths due to candle fires has not seen an increase as significant as the non-fatal injuries that have increased from 452 in 1994 to the current figure (772), which reflects the general increase in the number of reported fires.

Bedrooms and living rooms continue to be the most common location for the start of a candle related fire. Both show increases in the number of incidents over recent years.

In Europe, EHLASS data is not sufficiently detailed to provide a comparison of accidents recorded due to candles. Data has been collected from some countries directly.

The Netherlands recorded 360 injuries reported to A&E departments. The main causes of injuries were flames (29%), cutting (24%) and hot wax (21%). Candles account for 4% of fires attended by the rescue services in Sweden.

In the USA the annual average number of injuries reported to hospitals from candles is 6,800 but there has been a significant increase from 1991 to 1997 (around 8,900 injuries). Most injuries were non-fire related burns (24% from hot wax) or lacerations (39%).

The latest figures on household fires in the USA (1995) record 8,700 fires, causing 80 deaths and 990 injuries. There has been an increase in the number of fires over recent years with recorded data, but the number of deaths seems to be fairly constant.

Key points

There has been a increase in both accidents and residential fires due to candles in recent years.

When comparing the UK figures to other countries, the UK appears to have substantially more injuries reporting to hospitals than the Netherlands. Although the Netherlands' population is about a third that of the UK, our figures are around ten times greater in number. The significance of this is important when the usage of candles in the rest of Europe is considered to be higher than the UK.

Compared to the USA, which apparently has seen a similar increase in sales and types of candles as the UK, the increase in accidents in recent years is similar. Considering that the USA has just over four times the population of the UK, the proportional number of residential fires is similar – but the relative number of injures from these fires is lower than in UK.

The injuries associated with candle use are similar for the different countries considered. Beyond the more obvious injuries of burns (from hot wax or flames), lacerations are a common injury – from people trimming candles or scraping wax off or out of holders.

Using hospital accident data, fire service data and other sources it has been possible to provide information for the UK, some of the other European countries and the USA.

A range of UK case studies can be found in section 9 of the report.

5.1 United Kingdom

5.1.1 Home and Leisure Accident Surveillance System data

The data is collected from 18 hospitals that deal with a large number of A&E incidents (they provide a 24-hour service and take ambulance cases). Although there are around three hundred hospitals that would come under this description the 18 chosen are as representative as possible of this group.

The Home and Leisure Accident Surveillance System (HASS and LASS) database included records of a small number of fatal accidents, but these are not representative of fatal cases as a whole as few deaths occur during or after treatment in A&E units.

Estimates – National accident estimates are derived from the HASS hospital data. Because accidents are unpredictable and the outcome of random events, the generation of a national estimate from the sample of 18 hospitals is subject to some uncertainty. This uncertainty is qualified using statistical assumptions. A national estimate (E) result is presented with two confidence limits, lower (L) and upper (U). The number quoted is the best single estimate but with a degree of confidence that the true number is higher than L and lower than U, thereby defining the margin of error. This margin of error can be expressed as a number or percentage of the estimate figure.

Table 4 shows the number of HASS and LASS incidents recorded at A&E units and the national estimate related to lighting equipment in general and specifically candle related, from the 1997 report. Candles or candle wax accounted for 0.03% of all recorded HASS incidents.

Table 4: Hospital accident data (HASS and LASS) – candle related accidents

Article / Category		Number of Accidents	National Estimate	Lower limit 95%	Upper limit 95%
Lighting equipment (all)	HASS LASS	533	10,505	10,306	10,708
Candle/Candlewax	HASS	58	1,143	1,078	1,211
	LASS	7	138	116	163
Candlestick	HASS	23	453	412	497
	LASS	2	39	28	53

HASS – Home Accident Surveillance System LASS – Leisure Accident Surveillance System

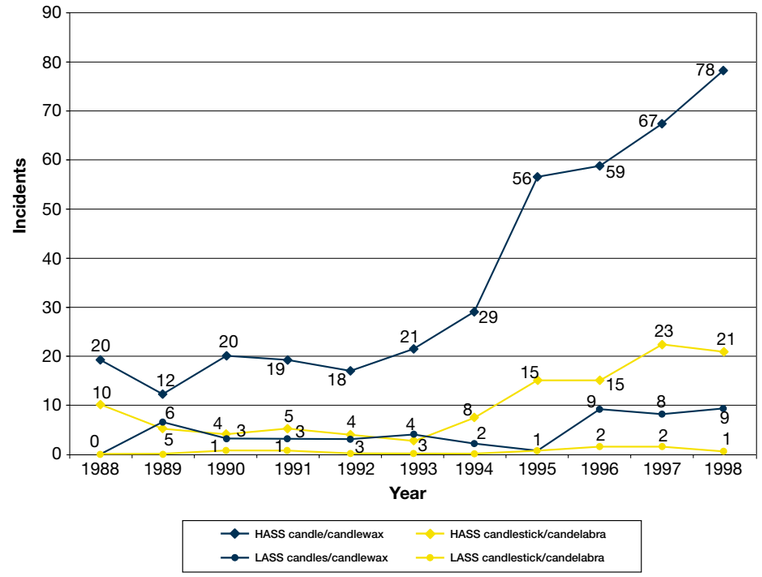
As a reference point there are only three article categories with accident figures below this – leisure/hobby equipment, animal's items and carrying equipment.

Within the lighting equipment category there were a similar number of incidents caused by electric lamps and 3,370 (L - 3,258 U - 3,486) due to light bulbs.

5.1.1.1 Historical accident data

Chart 2, below, shows the number of cases recorded through HASS and LASS over recent years. It shows a continuous increase, particularly in accidents involving candles and candle wax.

Chart 2: HASS and LASS records for 1988 to 1998



5.1.1.2 Detailed information from HASS and LASS over recent years

The information collected about patients attending the A&E units, between 1982 and1997, for the 18 hospitals involved in HASS and LASS has been assessed to gain greater detail on the types of accidents and patient information.

The data was extracted by searching for accidents related to candles, tealights and nightlights. Some of the individual cases were excluded from the analysis because the data was not directly related to the candle use (eg insect in ear when blowing out candle) or where the description 'nightlight' had been used for electric lamps or plug-in nightlights.

The number of incidents extracted by this method of searching gives slightly different numbers to the overall data provided for a search on accidents involving candles/candle wax and candlestick/candelabra (chart 2), particularly in the earlier years.

- The age range 15 to 64 years had the most recorded accidents (15 to 24 years; 25%, 25 to 35; 23%, 36 to 64 years; 23%)

- The most frequently recorded location was "Unspecified – indoors" (23%). Of the specified rooms 21% were in the bedroom, 14% in the lounge/dining or living room. Another substantial number were "Unspecified - in or out doors" (19%)

5.1.1.3 Type of accident

The description of "mechanism" for HASS and LASS figures identifies some of the causes of injury, but the detail has been analysed in an attempt to tie up the activity and how this lead to the injury (using information from 1989 to 1998) – see table 5 below.

Table 5: Type of injury from hospital accident data (1989 to 1998)

		Number	%
Lacerations	Holder	6	2%
	Other (eg. knife)	31	10%
Burns	Hot wax	84	26%
	Flames	123	39%
	Other	11	3%
Smoke		51	16%
Falls		4	1%
Other		9	3%

No detail is available on the type of candle that caused the accident, but there were five accidents involving either a television or stereo. In four of these the candle was on the top of the equipment and caused the fire.

- About 10% of injuries resulted in fires where the candle was left unattended, often when the user fell asleep. This number is probably higher though because there are other recorded accidents in bedrooms that do not necessarily state whether the user fell asleep, and other incidents (eg. curtains caught fire) may also have been a result of candles being left unattended.

  It is difficult to identify whether the cause of fires was due to a faulty candle, incorrect holder or inappropriate position, because this type of detail is not usually recorded.

  In some instances where bedding caught fire it can be assumed that the candle was close to the bed and the person moved the bedding close to the candle while asleep.

  Looking at the last two year's detailed data in particular, assumptions about the circumstances of the accident can be made in about 70% of cases (114 out of the 163 incidents)

- About 13% were lacerations caused by people cleaning wax off holders or trimming candles.

  eg. "*cutting wax out of the bottom of candle holder with a knife. Knife went through base of the holder into finger*"

- Hair or clothes catching fire accounted for around 11% of the incidents – these are assumed to be from people standing too close or leaning over candles.

- Burns tended to be from people moving lit candles, sometimes the result being hot wax burns or burns off the hot container. There were 12 identifiable cases from moving (about 10%).

  eg. "picked up hot candle and wax spilt onto hand"

  "burn to fingers on nightlight – had got a knife to take it out of incense burner – carrying it through to the kitchen when fell off knife and he tried to catch it"

- There were nine cases of hot wax or flame burns occurring when blowing out the candle – around 8%. These involved a mixture of circumstances from the hand behind a candle, to blowing out candles beneath oil burners. Large candles may present a problem if the person has to blow down into the candle (eg with a pillar candle), the wax can blow back up.

  eg. "was blowing out a candle last night, hot wax went into eye"

  "*blew out a large candle – flame and/or hot wax came back into face.*"

- Only a small number can be identified as due to inappropriate positioning. There were only four incidents where the description of the accident provides this clear reason.

  eg "had lit candle on kitchen draining board, opened window, went upstairs – wind blew curtain onto candle setting them alight"

- Some of the accidents (around 8%) were due to the candle falling over or the description suggests that a holder was inappropriate or not used.

  eg. "candle melted onto stereo"

About 11% of the identifiable causes stated that the patient fall asleep or left the candle unattended but it is not possible to determine the root cause of the fire – whether it was the candle coming into contact with flammable material or use of an inappropriate holder.

Overall the data does not provide any indication of major problems with the actual candles themselves – the majority of incidents and accidents are most likely due to how the candle is being used or handled.

Table 6, below, gives a summary of the analysis of 1997 and 1998 HASS and LASS detail to illustrate the explanations above.

Table 6: Attributed factors or conditions resulting in fire or injury (hospital accident data 1997 and 1998)

Total number of incidents	163
Total number of incidents where the description offers some explanation	114
Most common attributable circumstances	
Injury from knife used to clean holder or trim candle	15
Hair or clothes caught alight	13
Left unattended or fell asleep	13
Injury (usually burn) when moving	12
Injury when blowing out (usually burn)	9
Candle fell over or holder was inappropriate	9
Contact with curtains or other flammable materials	4

5.1.2 Fire Damage Reports

The Fire Damage Report (FDR1) was introduced in 1978, collecting fire statistical data from brigades. More detailed analysis of data was facilitated in 1994 by introducing an updated collection form and electronic data interchange. The data is used by the Home Office to produce the annual database of fire statistics.

The details of each property fire, and/or fire, involving casualties attended by UK fire brigades are collected.

Candle related incidents account for 3% of all dwelling fires.

Chart 3, on page 41, shows the number of accidental dwelling fires and casualties where the source of ignition was a candle.

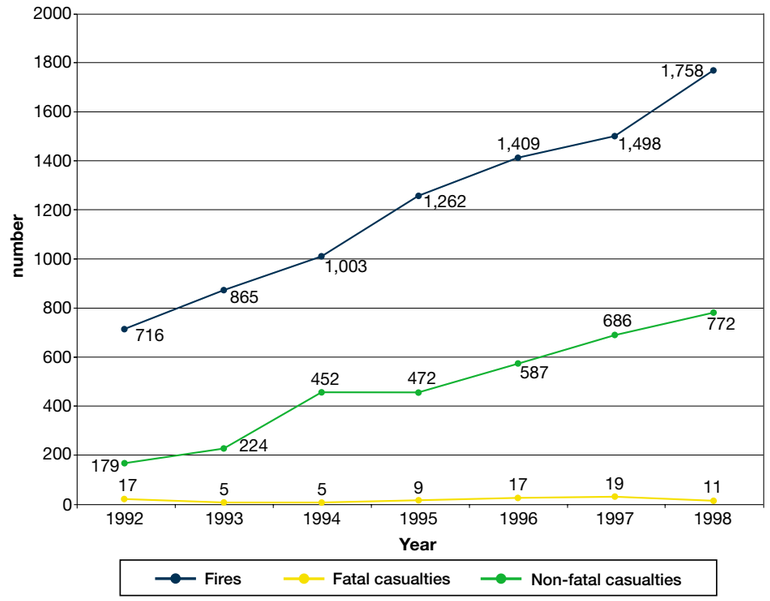
5.1.2.1 Definitions

Fatal fire casualty – death attributed to a fire, even if the death occurred weeks or months later

Non-fatal casualty – persons requiring medical treatment beyond first aid given at the scene of the fire. And those sent to hospital or advised to see a doctor – recorded as 'precautionary check-up'.

Recent years have seen an increase in the number of precautionary check-ups, which suggests an increase in the number of non-fatal casualties (up by about 50% in last 10 years) due to the referral of less seriously injured casualties to hospital.

Chart 3: Fire damage report data – dwelling fires 1992 – 1998



5.1.2.2 Detail of accident by location

Table 7, on page 42 summarises the data for total dwelling fires caused by candles over the last few years. It is in descending order showing the room or area with the most fires for 1998. Bedrooms and living rooms continue to be the most common location for the start of a fire relating to candles. Both show increases in the number of incidents over recent years.

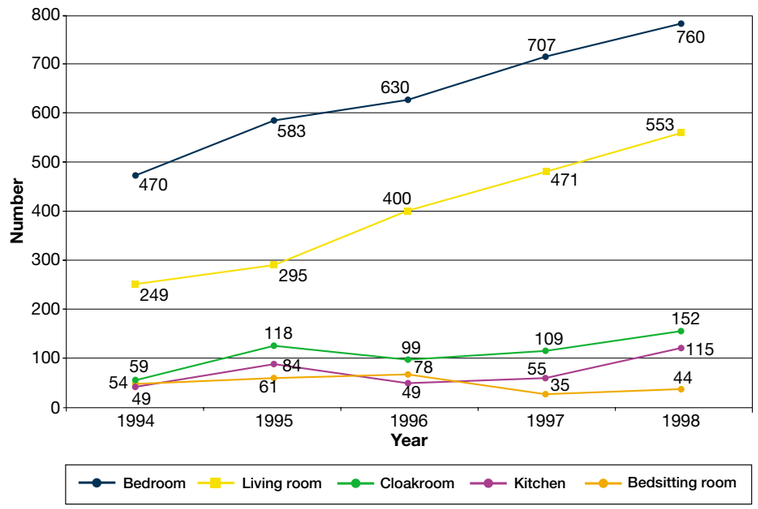
Chart 4, on page 43, illustrates the increase in number of incidents for the rooms most commonly associated with candle fires.

Table 7: Accidental dwelling fires(1) and casualties by use of room where the source of ignition was a candle, UK.

Year	1994	1995	1996	1997	1998
Total[2]	**1,003**	**1,262**	**1,409**	**1,498**	**1,758**
Use of room					
Bedroom, dormitory, cabin	469	583	630	707	760
Living room, Sitting room, Lounge	249	295	400	471	553
Cloakroom etc	59	118	99	109	152
Kitchen	49	84	49	55	115
Bedsitting room	54	61	78	35	44
Corridor, hall	14	25	16	19	35
Dining room	6	12	31	23	27
Store room	35	15	11	14	16
Stairs	12	5	11	9	11
Roof space used for storage	13	18	20	17	10
Roof space not used for storage	14	7	1	6	9
Unspecified residential type	23	5	20	2	7
Laundry room	1		6	1	5
Garage	1	9	1	2	5
Other residential type	1	8	1	8	2
Conservatory		3	11	4	2
Other room or compartment					2
Porch			5		1
Place of worship		10	7		1
Amusement arcade etc					1
Other access areas		1	1		
Other room of assembly	1		1		
Nursery				5	
Airing cupboard, drying cupboard	2	1		1	
Boiler room		1			
Garden shed	1				
Refuse		1			
Office			5		
Shop floor, showroom				4	
Sauna bath, turkish bath				5	
Not known			4		

(1) Including late call and heat and smoke damage incidents (not recorded prior to 1994).
(2) Figures are based on sample data.
P=provisional

Chart 4: Number of fires for most frequent locations

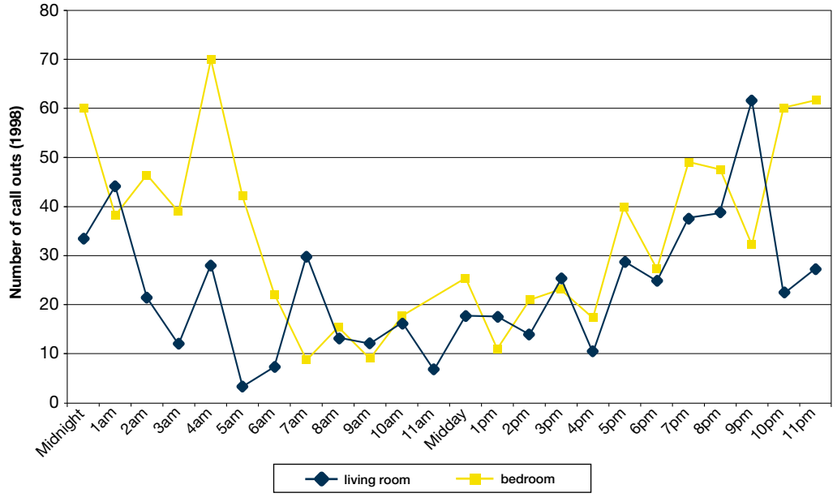


5.1.2.3 Details of accident by time of call out

Chart 5, on page 44, shows the time of call out for fires starting in the two rooms accounting for most incidents (1998 figures). There is some obvious themes such as the fact that less call outs occur around the middle of the day – which can be assumed to be because of less candle use at this time.

Fires starting in bedrooms begin to increase after about 6pm peaking at around 10pm and 11pm and again at 5am. Which would suggest that the candles are not being extinguished. Similar assumptions can be drawn looking at fires starting in the living room. Peaks at around 9pm and early hours of the evening could be attributed to candles being left unattended.

Chart 5 Number of fires in bedrooms and living rooms by time of call out



5.1.2.4 Details of accident by "first material ignited"

The information from the HASS and LASS data and from the location of the fires does not indicate the underlying cause of the fires. Candles being left unattended, in a room or due to the user falling asleep, still do not explain why the candle caused the fire.

By looking at the material or item first ignited it is hoped that this shows where the failures were – if it is due to candles burning down, falling over, or coming into contact with flammable materials.

Chart 6 shows the relative frequency of different material being first ignited by the candle. Only those that appeared in more than 30 cases are shown, however the table, on page 46, shows the full data set for 1998.

Of the specified materials, curtains and blinds are the most common material first ignited – accounting for 13% of the fires (unspecified accounts for 29% of the fires). Bedding (on a bed or mattress) is the first ignited material by a candle in 8% of the fires. These two examples suggest strongly that the candles are being inappropriately positioned.

Paper and cardboard are also high in the league of materials first involved, occurring in 11% of the fires from candles.

Chart 6 Material first ignited (1998) – main materials or items

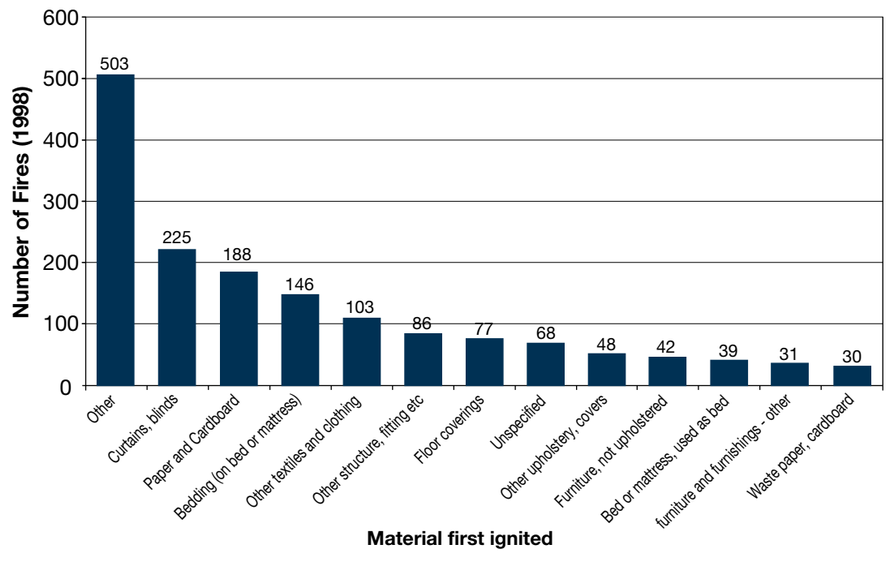


Table 8: Accidental fires[1] and casualties from fires in dwellings started by candles by material or item first ignited, UK, 1998

	Fires	Fatal	Non-fatal
Total	**1,752**	**11**	**772**
Other	503	1	178
Curtains, blinds	225	0	88
Paper and cardboard	188	3	92
Bedding (on bed or mattress)	146	1	84
Other textiles and clothing	103	4	93
Other structure, fitting etc	86	0	25
Floor coverings	77	1	33
Unspecified	68	0	18
Other upholstery, covers	48	0	45
Furniture, not upholstered	42	1	15
Bed or mattress used as bed	39	0	12
Furniture and furnishings - other	31	0	14
Waste paper, cardboard	30	0	6
Liquid petroleum gas	25	0	11
Other foam upholstery	23	0	8
Packaging and wrapping	15	0	11
Wall, partition, wall tiles	14	0	1
Internal fittings	13	0	12
Unspecified waste	12	0	11
Bed or mattress not used as bed	11	0	2
Clothing, on person (not nightwear)	9	0	7
Electrical insulation (excl. electric blankets)	6	0	2
Other gas	5	0	0
Diesel oil, fuel oil	5	0	0
Mains gas	4	0	0
Paint, varnish	4	0	0
Spirits	4	0	0
Other agricultural produce	4	0	0
Roof, roof members	3	0	0
Other Liquid	2	0	1
Paraffin	1	0	0
Other oils	1	0	1
Animal products	1	0	1
Clothing, nightwear on person	1	0	1
Combustion-modified foam upholstery	1	0	0
Floors, stairs	1	0	0

(1)Including late call and heat and smoke damage incidents (not recorded prior to 1994)

5.2 Europe

5.2.1 EHLASS

EHLASS records accident data from all EU member states, but the data is collected either from hospital surveys (like the UK HASS) or by household surveys. The latter tends to offer lower quality and less detailed information (but is cheaper to correlate). Germany, Spain and Luxembourg use house surveys. The rest of the members (12) - including the newer member states, Austria, Finland and Sweden - use hospital surveys.

There is no one place where the EHLASS data is correlated for simple comparison. All the countries produce their own summary of accident data once it has been recoded. This makes it very difficult to use and it does not give the same detail regarding the different types of accidents as the UK HASS. For this reason it has not been possible to analyse the detail on accidents relating specifically to candles across Europe.

It has been possible, however, to gain some detailed information from some European countries (the Netherlands seems to be the only country with anything substantial – the Alliance of Consumer Fire Safety in Europe, were also unable to find any detailed information other than that for the Netherlands.)

5.2.2 Denmark

The information below was provided by the Danish Fire Institute. Only data on deaths was available and, looking at this measure for other countries, death figures do not necessarily give an indication of the general level of accidents or fires. So, little can be assumed from these figures, other than with the number of households (around 2,300,000) a lot smaller than the UK (22,000,000), the death rate seems comparatively high.

Table 9: Denmark – Fires causing death (1994 to 1999)

Additional information from the Copenhagen Department of Fire Prevention indicates that they investigated 707 fires in Copenhagen and 34 (5%) were caused by candles.

Year	Number of deaths
1999	4
1998	5
1997	2
1996	3
1995	12
1994	4

5.2.3 Sweden

The Rescue Service in Sweden publishes annual fire statistics. For 1998, the national estimate for candles as the preliminary cause of the fire in dwellings was 263 - 4% of all dwelling fires. In addition children playing with fire caused 98 fires (1.5%). The largest cause of fires was 'soot fire' which accounted for 1,384 fires (21%). There is no detail in the Rescue Service report regarding the detailed circumstances of the fires.

5.2.4 Netherlands

The Dutch Injury Surveillance System (LIS) records statistics of people treated at A&E-departments of sixteen hospitals in the Netherlands (a representative sample of the total of about 130 general and academic hospitals with a continuous staffed A&E-department). The recorded numbers can be extrapolated to give national figures, provided the numbers are large enough.

The data was selected to show A&E-treatments due to accidents in which candles and tea warmers (both non-electrical) were involved. The selection includes patients who have been admitted to hospital after the A&E-treatment. The analysis period is 1997-1998.

The figures from LIS are national estimates per annum (rounded).

- About 360 people have to be treated at an A&E-department every year due to an accident with a candle or tea warmer.
- Most victims are between 20 and 54 years of age.
- 7% of all victims had to be admitted to the hospital after the A&E-treatment. This percentage is about equal to the admission rate of all home & leisure accidents.
- The injury is mostly the result of fire/flames, hot liquid/steam (often candle wax) or a cutting/piercing object (for example while cutting a candle).

Table 10, below, shows the annual number of A&E-treatments due to accidents with candles/tea warmers, by type of accident – the Netherlands

Table 10 The Netherlands - Annual number of hospital treatments, candle related, by type of accident.

Type of accident	Abs. number	%
Fall	10	3
Cutting/piercing object	90	24
Moving object	20	7
Poisoning	20	5
Hot liquid/steam	80	21
Hot object	20	5
Fire/flames	100	29
Other	20	6
Total	360	100

Source: Dutch Surveillance System (LIS), 1997-1998, Consumer Safety Institute

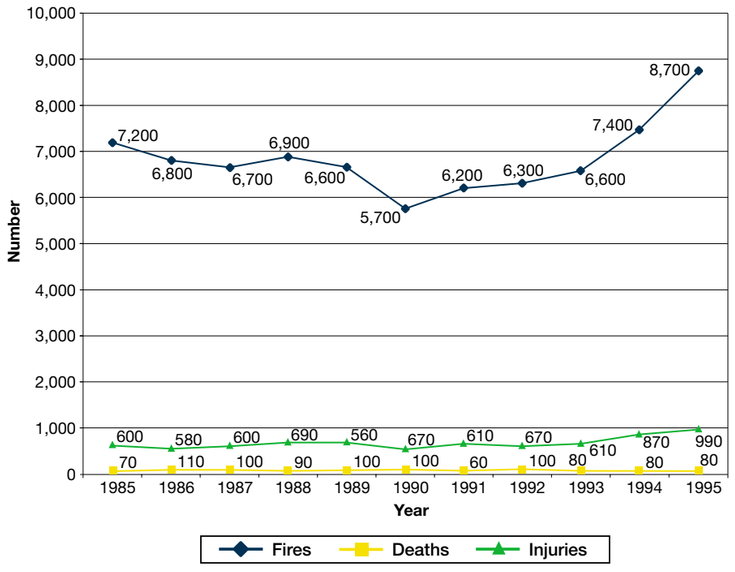
5.3 USA

Information is available from a 1998 Consumer Product Safety Commission (CPSC) report which includes National Fire Estimate data (obtained from the USA Fire Administration's Fire Incident Reporting System (NFIRS) for 1985 to 1995[1]) and National Electronic Injury Surveillance System (NEISS) from 1985 to 1997. Additionally it includes information from the In-Depth Investigation File (CPSC Investigated Incidents) from 1985-1997 which gives details concerning injuries and deaths associated with candles.

5.3.1 National Fire Estimates

Candles were involved in an estimated annual average of 6,800 residential fires, which resulted in 680 injuries and 90 deaths, from 1985 to 1995, based on data obtained from the NFIRS applied to national fire loss estimates developed by the National Fire Protection Association (NFPA).

Chart 7, below, shows the increase over the last 10 years:1985 to 1995



From the incidents between 1993 and 1995, looking at the annual average of estimated fire data:

- The majority of fires (59%), deaths (50%) and injuries (61%) were due to candles being abandoned or left unattended (40 deaths and 500 injuries).
- The next greatest cause of fire (18%) was due to candles being too close to combustible materials. This resulted in an annual average of 30 deaths and 150 injures.

[1]Estimates of aggregate fire losses for the nation are produced annually by the NFPA based on an annual sample survey of the public fire departments. Candle fires reported in NFIRS are weighted so that they represent the same proportion of NFPA estimated US residential structure fires as in the NFIRS database. The NFIRS is a nonprobability sample of fires attended by the fire service. It is believed to represent the overall national fire loss experience because of its large sample size. Fires were rounded to the nearest hundred, death sand injuries were rounded to the nearest ten.

5.3.2 Injuries Treated in Hospital Emergency Rooms (NEISS)

Estimated hospital emergency room treated injuries associated with candles (1991 to 1997):

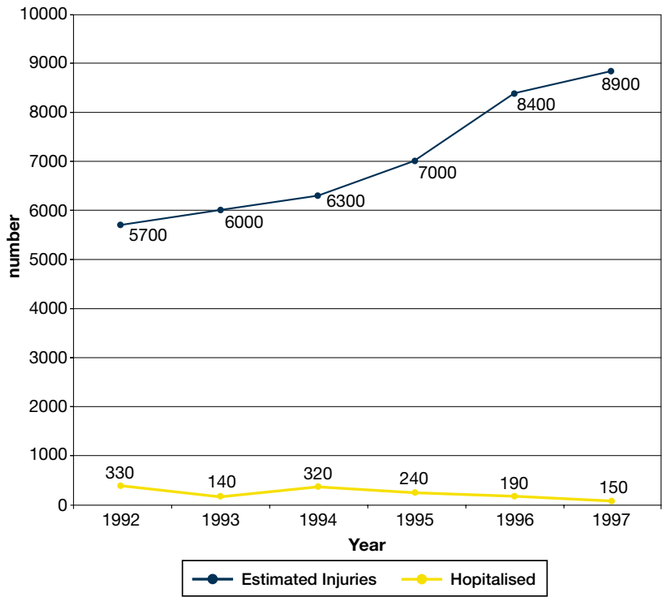
- Annually averaged 6800.
- Year on year the increase varied between 500 and 1400 in estimated injuries based on hospital emergency room treatments.
- For the most part, these injuries did not occur in fires attended by the fire service.

Chart 8, below, shows the gradual increase over recent years.

Looking at the estimated hospital emergency room treated injuries, associated with candles, by hazard scenario for the most recent three years (1995 through 1997 inclusive):

- lacerations accounted for 39% of the injuries
- burns accounted for 45% of the injuries
- other miscellaneous injuries accounted for 15%.

Chart 8: Injuries Treated in Hospital Emergency Rooms, 1992 – 1997 - USA



Source: National Electronic Injury Surveillance System (NEISS), U.S. Consumer Product Safety Commission/EHHA
Estimated injuries are rounded to nearest 100. Hospitalised injuries are rounded to nearest 10.
1997 Data is incomplete (Final estimates may by higher).
Paired t-test was done to determine a significant increase between years.

Table 11: USA - the estimated hospital emergency treated injuries, candle related, by type of accident (1995-1997)

USA - Estimated Hospital Treatment			
Hazard	**Scenario**	**Number of injuries**	**Percentage (%)**
Lacerations		**9500**	**39**
	Glass Candle Holders	3300	14
	Other Candle Holders	1800	07
	Other Lacerations	4400	18
Burns		**10900**	**45**
	Hot Wax	5800	24
	Flames	1200	05
	Candle Holders	200	01
	Ignited Combustibles	1500	06
	Other Burns	2200	09
Miscellaneous		**3800**	**15**
	Falls	500	02
	Other	3300	13
Total		**24,400**	**100**

5.3.3 Investigated incidents by the Consumer Products Safety Commission

Among the 160 Consumer Product Safety Commission (CPSC) investigated incidents for the period from the beginning of 1985 to the end of 1997, 112 were fire related and 48 were non-fire. The ignition of nearby combustibles and tip-over of candles were the main factors in the investigated fire incidents. High flames or heavy smoke and candle holders breaking, shattering, and exploding were the major factors in the non-fire incidents. Among the 160 CPSC investigated incidents, there were 61 injuries and 26 deaths. Candles were unattended while burning in 109 of the 160 (68%) incidents. Candles were burning for less than half an hour in 48 of the 160 incidents and more than one hour in 44 of the 160 incidents.

6. STANDARDS

This area of the research investigated the use of any recognised national and international standards relating to candles.

Summary

There is very little in the way of published or recognised standards relating to candles. The RAL – GZ041 *'Candles Quality Control'* produced by the Candle Quality Association is the only document found that relates to assessing the 'measurable performance' or quality of candles.

Key points

The RAL 'standard' identifies some of the areas of a candle's construction and burning behaviour that could be addressed. It is however lacking in some areas such as measuring the temperatures tealights reach and the flash point of wax (although specifying the quality of wax may address this).

6.1 Candle related standards search

Care has to be taken when looking for this sort of information because a search on nightlights will produce standards for the electrical plug-in type of lamps. There appears to be very little in the way of published or recognised standards relating to candles. The only one found from a search of standards was the RAL – GZ041 'Candles Quality Control' produced by the Candle Quality Association in Germany (see below for detail).

6.1.1 American ASTM

An official American standard was also found – ASTM F1972 – but this only covers terminology relating to candles and associated accessory items.

It is a guide to define standard terms that allows manufacturers, consumers, retailers, and the scientific community to use a common language to define candles and associated accessory items. For example, "*candle – one or more combustible wicks supported by a material that constitutes a fuel which is solid, semi-solid, or quasi-rigid at room temperature, 68°F to 80°F (20 to 27°C); it can also contain additives that are used for color, odor, stability, or to modify the burning characteristics; the combined function of which is to sustain a light-producing flame.*"

There is also a definition for a tealight but not nightlight – "tealight candle, a cylindrical filled candle produced with a diameter and height of approximately 1.5 in (38 mm) and 0.75 in (19 mm) respectively"

6.1.2 American National Candle Association

In America the National Candle Association (NCA) provides information on candle storage, use and safety at their website (www.candles.org).

It also details the pledge of their members:

- To ensure the quality and consistency of our products to the general consumer,
- To manufacture safe and effective products,
- To work with others in the candle industry, sharing non-proprietary information to produce the highest quality, most technically advanced candles,
- To represent the candle making industry in a positive way through manufacture and production of superior candles and/or candle products,
- To help enforce in individual standards of high quality products and commitment to consumers throughout the candle industry.

Despite this there does not appear to be a standard to enable the industry as a whole to meet this pledge in terms of quality and standardisation. The NCA technical group is carrying out some work, but this is in very early stages. They have not yet decided what characteristics of candles they will study. They may try to develop a voluntary standard and/or push for something with more authority from the ASTM.

6.2 The RAL 'standard'

The RAL* document is produced by Candles Quality Association in Stuttgart and covers the "General Quality and Inspection Specifications for Candles" and "Special Quality and Inspection Specifications for….

… Household Candles, Tapers, Pillar and Other Candles"

… Tea Lights"

… Sanctuary Candles"

and Appendix 1: Requirements for selection of manufacturing supplies used.

It was introduced in 1997. The document is designed to give a specification for manufacturers to meet in order to use the quality label of the Quality Association. At the moment this quality scheme is only operated in Germany, and there are no plans for it to be adopted more widely. According to the British Candlemakers Federation there was initial reluctance for it to be used outside Germany. There is still a question over how this standard, or something similar, could be extended or developed for use in other countries. Because of its informal organisation the European Candle Makers Federation is not in a position to develop their own quality standard.

According to the Candles Quality Association (Germany) there are about 35 manufacturers who are using the RAL quality label – mostly German manufacturers but also the Blythe group in the UK (although this is the Colony brand who are not really in favour of the current RAL certification requirements).

Many of the manufacturer's using this quality mark only have one type of product (eg. tealights) but in other cases, where a manufacturers range is more extensive, they have between 5 and 10 types certified.

During our research and purchase of candles we have not come across this RAL quality label on any products (except for one German manufacturer exhibiting a range of candles at the Spring 2000 Houseware and Gift Trade Fair).

** Reichs-Ausschuss für Lieferbedingunger (German Institute for Quality Assurance)*

6.2.1 What the RAL document covers

The first part details the scope of the monitoring measures – including initial inspection, self-monitoring, external monitoring and repeat inspections. The costs of monitoring are borne by the candle manufacturer.

Subsequent specification documents cover the different types of candles. For example, Quality specification for household candles includes:

- Appearance – centre position of the wick, smooth and evenness of the surface. Dimensions as specified on the packaging
- Burning behaviour – with a calm flame, curved wick, without visible soot, without dripping. Specified duration of any smoke trail after extinguished, in relation to candle diameter. Burning time as specified on packaging
- Testing - Burning test in draught free conditions. Burning cycles carried out depending upon size of candle:
- Wick curvature during burning to achieve 'self trimming' at flame edge.
- Drip fastness; where the rim of the burning bowl of molten wax prevents dripping.
- Smoking/afterglow; minimal soot release during burning and minimal afterglow.

The requirements for most of the criteria above are a pass / fail (good / poor) assessment, and are similar for other types of candles with the exception of tealights that includes a warming capacity test and minimising the wax remainder.

"Appendix 1 to Quality and Inspection Specifications – Requirements for the Selection of Raw Materials and Additives".

This provides requirements for the quality of raw materials and additives for RAL labelled candles (to prevent a harmful effect on users' health or affect the aesthetic appearance of the candle or fitness for use). Numerous DIN, ASTM and other standards are specified for determining the quality of the ingredients (eg. paraffin wax, stearic acids, beeswax). Wick quality is specified by description (eg. tear-resistant, slight afterglow) and dyes, colours and lacquers must have a limited heavy metal content, with certain dyes specified as unsuitable.

The manufacturer must have certification that the raw materials are in accordance to Appendix 1, from their supplier.

6.2.2 Practicality of the RAL Quality Scheme

In addition to the inspections, the scheme requires continuous self-monitoring of all the products displaying the quality label, including records (daily) to be available for inspection and retained for two years.

Informal discussions with manufacturers suggest that they would not find the RAL scheme very workable because of the sheer number of products they produce.

7. PRODUCT TESTS

Product tests have been included in this research to help identify if there are any inherent problems with particular designs and brands of candles.

Summary

Two main types of candles were included in the product tests - tealights and decorative candles (with embedded material).

The tealights included plain, coloured and scented examples. There was only one significant product failure – several samples of a pack of white tealight ignited.

Despite predicting that scented and colours tealights would present possible problems, it was not possible to attribute any particular design or style of tealight to particular burning characteristics.

One of the candles with a decorative design applied and embedded with dried flowers, also posed a risk due to the decoration catching alight.

Some candles allowed molten wax to run from the candle.

Key points

The tests were limited to a snap-shot assessment of tealights and candles on the market, but within this selection some products posed risks to consumers.

There is not an obvious characteristic that can be identified as presenting an unsafe candle.

Those that were originally considered to pose a risk did not necessarily burn dangerously in our tests.

7.1 Product selection

The market for tealights and candles is very diverse in terms of types and supply. But the two important and growing areas of the market are nightlights/tealights and candles with additives – particularly physical, ie decorative pieces of wood, dried flowers etc.

The general aim was to attempt to compare some of the cheaper, unbranded products available with better known brands.

7.1.1 Tealights

There have already been various test reports regarding tealights (see below)[2]. Many of them were investigating particular uses of candles, eg use of burners or base temperatures of tealights placed on televisions. The testing for this report aimed to expand on this work to see if there were differences in the behaviour of a range of different brands/supplies available rather than the more generic investigations covered by earlier reports.

- Research by the Building Research Establishment for the Consumer Safety Unit in 1996 considered the burning characteristics of tealights and their use particularly in burners.
- The Stanger report in 1998 included laboratory testing of tealights, following up earlier research into the base temperature of such candles and the potential for them to melt plastic (eg. top of a TV). It particularly considered the problem of "double wicking" leading to the ignition of the wax.

Tealights from the three main brands were used for reference purposes. A selection of other products, bought unbranded or from cheap outlets, were compared with these for burning behaviour and safety. In doing this we hoped to include a number of candles using different qualities of wax and wicks. Colours and scents are also being introduced into this area of the market so samples of this type were also included.

Because there is some confusion between the names "tealight" and "nightlight", products of both descriptions were included to see if there are physical differences and identify any different burning characteristics.

[2]Fires Associated with the use of nightlight candles - London Fire Brigade (Dave Townsend) Oct 1999
Ignition of televisions by nightlights - Stanger Science (for above) Apr 1996
Time temperature profiles of burning nightlights (further work) - Stanger Science (for DTI) Nov 1998
Fires associated with the use of nightlights and ceramic burners - Consumer Safety Research DTI Jul 1996

Table 12: Brand list of tealight/nightlights selected for testing

Brand	Type (no.)	Price (non-sale price)	Shop	Date bought	Code
Plain White Tealights					
Bolsius	White tealights	£2.99	Wyevale Garden Centre Wavendon	24/11/99	WA
Colony	White tealights	£1.99	Box of Delights, Flitwick	11/1/00	WB
Price's	White tealights	£2.99	Sainsburys, MK		WC
Salco Waxy Facts	White tealights	£3.99	What Everyone Wants, Swindon	23/12/99	WD
Discovery Store	White tealights	£3.00	Discovery Store, MK	7/1/00	WE
Poundstretcher	White tealights	£0.49	Poundstretcher, Swindon	23/12/99	WF
The Candle Collection	White tealights	£0.99	What Everyone Wants, Swindon	23/12/99	WG
Premier	White tealights	£1.10	Blinds Direct, Kingston, MK	26/11/99	WH
Days Gone Bye	White Tealights	£1	Days Gone Bye, MK	23/12/99	WJ
Ikea	White tealights	£3	IKEA, Brent Park	13/1/00	WK
Angelic	White tealights	£2.60	Angelic, Covent Garden	13/1/00	WL
Coloured tealights					
Discovery Store	Coloured tealights		£2 Discovery Store, MK	10/12/99	CA
Creative Candles	Coloured tealights + holder	£0.75 (£1)	Days Gone Bye, MK 7/1/00		CB
Nightlights					
Price's	Sentinel Nightlights	£0.99	Waitrose	11/1/00	NA
Scented tealights					
Price's Bluebell	Scented tealights				SA
Bolsius Aromatic	Scented tealights				SB
Body Shop Fandango Nightlights	Scented tealights	£1.50 £3	Body Shop, MK	7/1/00	SC
Boots Aromatherapy Nightlights	Scented tealights	£2.50	Boots, MK	7/1/00	SD
Wax Lyrical Strawberries & Cream	Scented tealights	£4.95	Wax Lyrical, MK	7/1/00	SH
Carolina Designs pleasure Aromatherapy	Scented tealights	£1.99	Homebase, MK	7/1/00	SJ
The Candle Collection Apple	Scented tealights	£0.99	What Everyone Wants, Swindon	23/12/99	SK

7.1.2 Decorative Candles

This market is diverse in terms of types, size, quality, and branding (or lack of branding).

In an attempt to ring fence the popular sector of the market, only candles sold with additives for decoration were tested. This area of the market is growing and candles with physical inclusions (eg dried flowers, coffee beans) were selected. The aim of the test is to look for differences in the brands and try and identify and illustrate safe and unsafe types of design. Some are surrounded with a denser wax that includes the decoration, others have decoration attached directly on the outer edge of the candle (eg lengths of thin cane).

The range of products selected were those found on the market at the time of the research and included candles from reputable chain-stores, such as M&S, and unbranded products found in general or gift stores.

Table 13: Brand list of decorative candles selected for testing

Brand	Type (no.)	Price (non-sale price)	Shop	Date bought	Code
Embedded/decorative candles					
M&S Flower inlaid	Inlaid	£8 (£12)	M&S, MK	7/1/00	DC
M&S Oriental Blossom	Inlaid	£8 (£12)	M&S, MK	7/1/00	DD
Coffee Bean small	Inlaid	£0.75 (£1)	Days Gone Bye, MK	7/1/00	DG
Bath & Body Rosewood	Inlaid	£6.50	Bath & Body Works, MK	7/1/00	DJ
Natural Collection bamboo	Bamboo covered	£5	Days Gone Bye, MK	7/1/00	DK
Vincents Candles	Inlaid	£12.99	Box of Delights, Flitwick	11/1/00	DL
Angelic Bamboo	Bamboo covered	£6.99 (£8.99)	Angelic, Covent Garden	13/1/00	DM
Angelic Apple & Cinnamon	Inlaid	£12.99 (£14.99)	Angelic, Covent Garden	13/1/00	DN
Candle Shop	Inlaid	£8.95	The Candle Shop, Covent Garden	13/1/00	DP
Candle Shop	Grooved	£4.95	The Candle Shop, Covent Garden	13/1/00	DR

7.2 Methodology

The main criteria assessed were:

- Temperatures – base surface temperatures, wax temperatures
- Flame heights
- General burning characteristics – soot emission and wick behaviour
- Burn time
- Safety of additional ingredients eg dried flowers

The RAL document was taken as a guideline for assessing the burning characteristics and, for the large candles, for determining the burning cycles. The tealights were left to burn continuously until they burned out. The large candles were burned for periods of 3 hours at a time with full cooling-off in between.

7.3 Test results

7.3.1 Tealights

The tealights tested tend to be around 16mm tall with a diameter of around 37mm. One of the plain white tealights was noticeably taller – 23mm – and claimed a burn time of 9 hours (see 7.3.1.1 Product Failures, page 62). Two of the scented products (SC and SD) are labelled as nightlights but are both a similar size to the tealights.

In most instances the base temperature of the tealight corresponded with the size of the candle and hence the burning time. The Price's nightlight was larger than the other products and burned for around 10 hours – contributing to a high base temperature. One of the products described as a nightlight (SC), although a similar size to a tealight, did burn

for around 8 hours (closer to the time expected from a nightlight). However, it did not give a particularly high base temperature – this could be because it is a Body Shop product and non-petroleum based.

Table 14, below gives the test results for all the tealights and nightlights used in the product test (code relates to the product details in the brand list given earlier in this section).

There were some differences in the temperatures reached and flame heights but it is difficult to draw any conclusions in relation to the size, type or origin of the candles. The product giving the hottest base and wax temperatures was a scented tealight, but this was probably because of its long burning time. From these tests it is not possible to identify a type of candle (coloured or scented) that presents a particular potential risk. None of the tealights/nightlights burned with particularly dangerous wick angles or flame sizes with the exception of the one plain tealight, detailed below (see 7.3.1.1 Product Failures).

Table 14: Summary of burning characteristic of tealights and nightlights – by type

	Base temperatures °C temperatures	Wax temperatures °C	Flame height mm	Burning time Hours:mins
Plain tealights	54 to 79	66 to 99	6 to 35	3:08 to 6:02
Nightlight	107 (max)	130 (max)	19 (max)	10:53
Coloured tealights	50 to 79	81 to 94	9 to 48	1:10 to 4:18
Scented tealights	34 to 142	71 to 167	9 to 35	1:13 to 8:26

Table 15: Test results for all tealights and nightlights tested

Code	Height (mm)	Diameter (mm)	Base temp (ºC)	Wax temp (ºC)	Flame height (mm)	Min - Max Burn time (hrs:mins)
WA1	15.56	37.80	55.8	96.8	20 - 25	3:30
WA2	-	-	79.3	95.1	20 -25	3:44
WB1	16.39	37.04	65.1	98.5	20 - 22	3:35
WB2	-	-	64.6	95.1	20 - 22	3:57
WC1	14.27	37.86	71.8	94.5	16 - 20	3:48
WC2	-	-	73.7	91.2	16 - 20	3:59
WD1	14.23	36.85	63.6	83.2	16 - 20	4:56
WD2	-	-	64.6	83.4	16 - 20	4:40
WE1	14.24	36.89	61.0	92.7	6 - 20	5:04
WE2	-	-	71.6	85.1	6 - 20	4:26
WF1	12.23	36.53	65.5	70.3	12 - 17	4:41
WF2	-	-	69.6	71.2	12 - 17	3:56
WG1[1]	22.62	36.71	75.5(329.1)[2]	85.9	13 - 23	5:25
WG2[1]	-	-	146.2(297.0)[2]	165.3	13 - 23	6:02
WG3[1]	-	-	50.0(308.0)[2]	78.0	13 - 23	5:16
WG4[1]	-	-	60.2(290.0)[2]	82.6	13 - 23	5:22
WH1	13.95	36.66	78.8	86.1	7 - 35	3:31
WH2	-	-	70.4	75.5	7 - 35	3:08
WJ1	15.98	37.72	78.1	83.9	16 - 23	4:33
WJ2	-	-	68.5	80.2	16 - 23	4:44
WK1	15.65	37.63	66.5	77.4	19 - 21	4:10
WK2	-	-	78.5	91.0	19 - 24	3:52
WL1	15.20	37.73	54.0	66.2	16 - 19	4:39
WL2	-	-	56.6	67.5	15 - 20	4:44
CA1	14.47	37.32	78.9	85.4	13 - 48	2:51
CA2	-	-	76.1	81.4	11 - 37	4:18
CB1	13.47	37.16	49.3	93.9	19 - 20	1:10
CB2	-	-	67.0	91.5	9 - 20	3:54
NA1	25.63	36.65	93.3	107.2	9 - 18	10:53
NA2	-	-	106.8	130.2	9 - 19	10:10
SA1	16.82	38.24	33.5	71.5	32	1:13
SA2[1]	-	-	91.2	94.4	17 - 26	4:04
SA3	-	-	86.7	100.4	26 - 35	3:35
SB1	16.36	38.36	80.9	88.2	13 - 22	5:59
SB2	-	-	82.3	93.3	17 - 33	3:19
SC1	16.82	36.71	51.0	71.1	7 - 19	8:26
SC2	-	-	63.7	73.9	10 - 16	7:44
SD1	15.57	37.28	78.4	108.4	22 - 28	3:24
SD2	-	-	64.8	83.0	12 - 21	5:18
SH1	16.30	37.65	64.2	101.9	25 - 30	3:35
SH2	-	-	81.0	88.3	21 - 24	4:10
SJ1	16.54	37.44	82.5	87.0	19 - 29	4:17
SJ2	-	-	79.2	96.6	19 - 25	4:30
SK1	23.91	37.15	142.0	167.0	18 - 26	6:16
SK2	-	-	127.0	145.0	18 - 28	6:21

Notes

1. Wax ignited
2. Figures in parenthesis are the maximum temperatures recorded during wax ignition

7.3.1.1 Product Failures

One sample of the Price's Bluebell scented tealight caught fire, but other samples from the same source did not – even though the wax temperature of one of these was measured to be higher than the one that did ignite.

The white tealights by 'The Candle Collection' ignited after about 5 or 6 hours burning (depending upon the sample). Two out of three samples initially burned caught fire as did two samples used for retests. The resultant base temperature of the tealight was around 300°C. In addition to potentially damaging any surface they were on, a product catching fire like this presents a risk to a consumer attempting to deal with the fire.

The candle did not demonstrate any particular characteristic that could be attributed to the wax igniting, other than it is a deep tealight compared to others purchased. Analysis of the video taken during the burning test does not show any signs of 'lumping' at the end of the wick – sometimes a cause of excessive heat generation and subsequent ignition of the wax. Scented versions of the same brand did not catch alight.

Table 16: Summary of burning characteristics for "Candle Collection" tealight

	Max base temperatures before ignition	Max wax temperatures ^{0}C	Max base temperature after caught alight ^{0}C	Final burning time Hour:min	Time tealight was alight mins
WG1	76	86	329	5:25	21
WG2	146	165	297	6:02	28
WG3	150	78	308	5:16	23
WG4	60	83	290	5:22	42

7.3.2 Decorative Candles

The products tested all had some form of embedded material or decoration attached to the outside. The actual samples selected were considered to present a particular risk or were of a particular construction.

Only one candle of each type was burned, so it must be appreciated that the tests do not necessarily represent all the candles available. They were also burned in ideal situations without any draughts or other interference.

Embedded Flowers – M&S (Code DC)

This candle burned with the wick slightly off centre – so the side of the wax thinned around about a third of the candle. After 18 hours the upper edge in this region began to roll in and melt. The wick burned with quite a bit of debris. It extinguished itself after around 26 hours.

Embedded 'Oriental Grass' – M&S (DD)

This candle had inlaid oriental grass around the edge. It burned satisfactorily with an even burning bowl for around 36 hours. The subsequent burn period exposed a small piece of

the grass at the upper edge of the wax still surrounding the candle. The candle burned itself out during the next burning cycle after 68 hours. Further burning cycles exposed more grass as the wax around the upper edge of the candle thinned.

Coffee Bean - (DG)

The coffee beans are embedded in the bottom half of the candle. It burned down relatively evenly with the upper edge rolling in. The flame had melted the wax down to the level of the coffee beans after about 27 hours. At least one bean came away from the side, but did not move far from the edge. The wax around the top thinned as the flame began to burn lower than the level of the beans. The candle burned itself out shortly after 48 hours.

Embedded Flowers – Bath & Body Rosewood (DJ)

This candle burned in an acceptable manner for around 24 hours in total, with an even thickness of wax still intact around the top of the candle. In consecutive burns the wax around the top thinned particularly on one side and began to expose a plastic 'bowl' within the walls of the candle. In the area of the exposed plastic the wax progressively melted away - presumably due to the heat conducted by the plastic. The test was stopped after 78 hours. No damage occurred to the plastic 'bowl' and none of the embedded decoration was damaged.

Bamboo edged – there were two examples of these.

One had the thin bamboo canes loosely attached on the outer edge - Natural Collection (DK), the other had them slightly inlaid into the wax – Angelic (DM). In neither case did the cane catch fire as expected.

The Natural Collection (DK) candle with the loose cane around the edge spilled liquid wax out of the sides after 9 hours burning – once the burning bowl of wax extended to the edge. As the candle burned down most of the wax was melted away from the inside edges, exposing the cane and releasing more molten wax as it did so. Because of the high sides of cane in relation to the wick the candle became difficult to light (blacking around the top edge of the cane is due to singeing with a match when lighting). The candle finished burning after a total of around 73 hours.

The Angelic candle (DM)

This candle burned with a slightly off-centre burning bowl of wax. At the end of the 21 hours burning the wax inside was beginning to expose the bamboo around about a quarter of the circumference of the candle. Although a thin layer appeared to be left on the inner side of the candle for some time. Each time the candle was re-lit the area of the burning bowl of wax tended to move so different amounts of wax were left on different parts of the inner wall of bamboo. After about 51 hours about 2/3rd of the upper edge of bamboo was free from wax. The candle maintained a rim of wax at the level of the flame to prevent wax running through the sides of bamboo. It burned for a total of about 71 hours.

Embedded Plant (oriental grass) (DL)

This candle had what looked like a denser layer of wax around the edge with the embedded material in it. Although the burning bowl was not always completely central on each burn, for up to 15 hours only the wax down the centre area had melted away. After this point a small area of the denser outer wax was melted slightly because the burning area was not central. Gradually over subsequent burns the embedded material was exposed but this was only around the upper edge of the candle and was some distance way from the flame. The candle continued to burn but the test was terminated after 78 hours.

Embedded Apple and Cinnamon – Angelic (DN)

The embedded slices of dried apple and cinnamon sticks were present in the lower half of the candle. The candle burned with a regular burning bowl down the centre. But after 30 hours there was a lot of wick ash around the centre. The upper edge of the wall of wax began to melt down in two areas, but the remainder of the upper edge stayed in place. A piece of dried apple became exposed on the inside, below the area where the upper edge had thinned, after around 60 hours. The apple showed slight signs of singeing after 66 hours. The candle continued to burn but the test was terminated after 78 hours.

Embedded Dried flower and Surface Painted – Candle Shop (DP)

This unbranded candle has dried flowers inlaid and a picture that appears to be painted or lacquered onto the surface.

From the start the candle had a relatively high flame height (around 50mm) and after 9 hours there was a lot of wick ash. The upper edges of the wax melted inwards. After 12 hours the wick was large and curved right over giving a large flame (around 70mm) that melted two-thirds of the upper edge. The edges gradually deteriorated exposing the dried flowers which bent in toward the flame. These caught fire after around 19 hours causing the flame to spread to other embedded materials and decoration and the collapsing of the sides – molten wax flowed from the side.

Grooved - Candle Shop (DR)

This candle is carved with a spiral of grooves down the side. The candle tapers up to the wick.

During the first stage of burning the molten wax was able to flow through the sides of the candle – where the burning bowl had melted wide enough to open up the sides. As the candle continued to burn the sides collapsed outwards and more wax was released. It burned with an increasingly high flame (up to 55mm) as more wick was exposed by escaping wax. The candle burned itself out after 13 hours.

8. PRODUCT RECALLS AND NEWS ITEMS

Summary

In the last six years there have been around 12 product recalls relating to candles in the UK. The actual reason is not always recorded and it is difficult to identify a common theme from this limited number of candle failures. Country of origin is also rarely stated, so this can not be concluded to be an attributable factor.

In the USA there have been a slightly larger number and the information given provides clearer themes. The most commonly occurring reasons relate to the container failing or an excessively high flame when burned.

Additional Information

During the course of the research many examples of publicity relating to candles have been found. These include product recalls and items in newspapers and magazines. The depictions of candles in use, shown in women's and lifestyle magazines, is discussed under Section 2 "Candle popularity and media influence" page 24.

The product recalls and news items are useful, if not necessarily representative, in considering the nature of problems experienced with candles.

8.1 Trading Standards

The Institute of Trading Standard Administration (ITSA) and Local Authority Coordinating Body on Food and Trading Standards (LACOTS) were also approached for information on recent cases, but little useful information was gathered.

8.1.1 Lancashire County Council

The Trading Standards Officers for this Authority carried out some research into decorative Christmas candles. Of the 51 candles tested, 20 posed a potential fire hazard. Three out of nine candles tested set fire to the base or attached decoration once the candle burned low.

8.2 Recalls

Table 17, page 66, summarises recent product recalls in the UK and USA.

In the USA there have been a slightly larger number and the information given provides clearer themes. The most commonly occurring reasons relate to the container failing or an excessively high flame when burned.

Table 17: Recent product recalls - UK and USA

Date	Product	Manufacturer / retailer	Country of Origin	Problem
		UK		
Jan 2000	Oil Burner (Relaxation Gift Pack)	WH Smith/John Menzies		Safety issue (?)
Dec 1999	Gold and Silver Star Candles	NEXT Directory		Hazardous burning characteristics
Dec 1998	Decorated novelty candles	Great Mills	China	Coating may ignite
Apr 1998	Glass & resin candleholder	H. Samuel		Safety issue (?)
Apr 1998	Fragranced gel candles	Tesco		May flare
Dec 1997	Nite Lite Snowmen candles	B&Q		Melted wax catching light
Mar 1997	Night light holders	Imperial Cancer Research Fund		Rubber melted with acrid fumes
Feb 1996	Candle Lanterns	IKEA		May overheat and flare up
Dec 1995	'Jelly' candle holders	Habitat		Resin holders may ignite
Dec 1995	Hanging brass lanterns	Woolworths		Heat from candle causes hanging hook to detach
Dec 1994	Decorated Christmas candles	House of Fraser/ Debenhams		Potential fire risk
Nov 1994	Goblet aroma jar	Body Shop		Jar can shatter (no mention of candle)
		USA		
Dec 1999	Millennium Martini candles	Hanna's Candle Co.		Glass holder can crack
Dec 1999	Christmas Tree and Cherub candles	Fashion Bug	China	Gold coating can ignite
Nov 1999				
Jun 1999	Angel candle holders	Atico		Can melt if in contact with candle flame
Apr 1999	Fragranced tinned candles	Calvin Klein		Can burn with higher than normal flame
Feb 1999	Scented Jewel Candles	The Body Shop		Pots made in China Glass pots can explode
Oct 1998	Windmills with candles	Boscov's Dept Store	China	Candles too close to wooden windmill – fire risk
Sep 1998	Paper candle shades (!!)	Mackenzie-Childs Ltd		Shades can ignite
Jun 1998	Thoroughbred Candles	Ralph Lauren		Flasks overheat and cause high flames
May 1998	Gel Candles from Glade	S C Johnson		High flames (3")
May1998	Floral candles	Amscan Inc	China	Containers can break and hot wax escape
Dec 1997	Three-Wick candles	Gump's by Mail Inc	Japan	High flames
Oct 1997	Hallowe'en bleeding hand	Magic Creations		7" high flames
Dec 1996	Pot Pourri simmer pots	New Design Inc		Excessive flame
Nov 1996	Hallowe'en Hand candles	Walgreens / East West Distributing Co		8" high flames
Oct 1966	Bleeding Hand Hallowe'en candles	Holiday Candle Products		8" inch high flames
Oct 1996	Hallowe'en Hand candle	C R Seasons		8" inch high flames
Oct 1996	Glowing Gore & Dem Bones Hallowe'en candles	Russ Berrie & Co Inc		10" high flames
Sep 1996	Botanical candles - Lavender	Bath & Body Works		Dried flowers can ignite
Jul 1996	Texas Terra Cotta potted candle sets	IMSA International		Pots can overheat and catch fire
Dec 1995	Tree Shaped 7 Light Votive Holders	Silver Art Co		Godinger Glass pots can overheat and shatter
Apr 1995	Satellight Oil Candles	Glass Dimensions		May leak fuel – fire hazard
Dec 1994	Santa Claus candle holders	Division Sales Inc	China	Flammable paint on figures
Oct 1993	Hallowe'en candle holders	Various – CPSC		warning Can overheat and flare

8.3 News Items

A search of recent items appearing in the press was carried out using Reuters Business Briefing. It is a useful gauge of the type of material likely to be used and also gives some very basic information on the types of accidents reported.

As well as reports on serious accidents it is useful to see that fire brigade awareness campaigns also get coverage in a range of publications.

Table 18: Recent news items in press (Reuters Business Briefing)

Date	Publication	Nature of report
29/12/1999	Gloucestershire Echo	Facial burns when blowing out candle in candle holder. Comment from Fire officers on using candles safely
29/12/1999	Evening Mail (Birmingham)	Unattended candle fell over and started bedroom fire. Fire experts advice on not leaving candle unattended.
28/12/1999	Scunthorpe Evening Telegraph	Fire brigade general message about safe use of candles during festive season
27/12/1999	The Mirror	Two children died in fire started by Christmas candle left burning overnight (Weston-Super-Mare)
24/12/1999	Western Morning News	Warning about candle use - response to DTI/HO press release. Also refers to Weston-Super-Mare fire (as in the Mirror)
22/12/1999	M2 Presswire	Finnish Consumer Agency website - advertising the fact that they publish information of product recalls, particularly pumpkin lanterns three of which were withdrawn.
22/12/1999	Birmingham Post	Two children died in fire started by Christmas candle left burning overnight (Weston-Super-Mare)
22/12/1999	The Citizen (Gloucester)	Two children died in fire started by Christmas candle left burning overnight (Weston-Super-Mare)
22/12/1999	Western Morning News	Christmas candle burned down and through hi-fi. Smoke alarms did not work - warning about using candle with Christmas decorations and not to take batteries from smoke alarms
21/12/1999	Scotsman	Twelve escape fire in Edinburgh block of flats after candle near curtain was knocked over and started fire.
21/12/1999	Evening Mail (Birmingham)	Warning about counterfeit goods in the run up to Christmas and Government minister recalls daughter burned by dangerous candle
20/12/1999	Evening Express (Aberdeen)	Grampian Fire Brigade warns of hazards of using candlelight during festive season - linked up with local retailers to produce a safety leaflet
20/12/1999	Daily Telegraph	Letter to the editor regarding the use of candles for new year – holders for churches candles approved: from Archbishops' Officer for the Millennium
16/12/1999	Nottingham Evening post	Care using candle at Christmas - Notts Fire Service have seen a doubling of house fires from candles. Safety advice given including suggestion that floating candles are the safest.
14/12/1999	Nottingham Evening post	Derbyshire fire fighters new campaign warning about danger of decorative candles. - look for quality candles as apposed to cheap imports.
14/12/1999	Grimsby Evening Telegraph	Lincolnshire fire brigade warning people to take care with candles at Christmas - safety advice given.
08/12/1999	The Sentinel (Stoke)	Five year old died in tent on holiday in Wales - mother fell asleep whilst burning nightlights on metal plate
29/11/1999	The Sentinel (Stoke)	House fire for candle left unattended which lit curtains - smoke alarm did not work.
15/10/1999	Evening Express (Aberdeen)	Warning about hazards of smooching by candlelight after fire in Coronation Street. Store owner of Juniper offers advise and safety leaflet with purchases. Comment from RoSPA.
13/10/1999	Grimsby Evening Telegraph	House fire from knocked over candle in loft.
04/10/1999	Herald Express (Torquay)	House fire from candle falling over and lighting settee in bedroom
30/09/1999	South Wales Evening Post	Mid and West Wales Fire brigade awareness campaign after growing number of fires (attributed to aromatherapy candles). Safety advice given
26/08/1999	Evening Mail (Birmingham)	Candle during power cut caused flat fire. Went to bed without extinguishing candle
23/08/1999	The Sentinel (Stoke)	House fire from unattended candle in bedroom (by children) which set curtains alight
17/08/1999	Scotsman	House fire from aroma candle in hearth (suddenly caught fire?)
16/08/1999	The Times	Girl died in tent fire in Anglesey (same incident as 08/12/99 The Sentinal)
08/06/1999	Evening Mail (Birmingham)	Concerns from United Kingdom Alliance (alcohol education charity) about use of candle at new year. "40% of deaths from fires involve alcohol"

9. CASE STUDIES

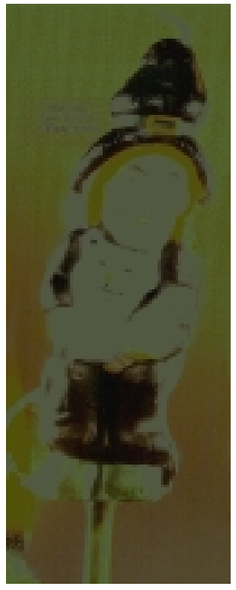
Below are three case studies involving house fires which illustrate consumer misuse of candles and highlight the need to better educate candle users in the safety aspects of using candles and nightlights.

9.1 Case Study - Liverpool

In November 1999 there was a serious fire in a terraced house, rented by a young family with 2 children. The fire occurred in the early morning (sometime after 7.30am) in the rear lounge of the property. A five year old girl died as a result.

Candles had been used the night before the fire, as a means of lighting, as the electricity circuit had failed. 3 candles were in use - 2 fragranced candles (one placed on a table and the other on a stereo turntable) and one Halloween witch on a stick candle, placed in a large whisky bottle on the floor. The description of the Halloween candle (6" tall candle on a 24" long wooden stick) suggests that this was an outdoor flare, similar to that shown below. It is not certain whether the candles were extinguished before the adults retired to bed (at about 5.00am), but when the son came downstairs at about 7.30am the Halloween candle was burning. The young girl was asleep on the settee in the lounge at that time. No-one else was in the room with her.

Merseyside Fire Brigade has attributed the cause of the fire to the unsupervised use of candles, in particular, the Halloween candle described above.



9.2 Case Study - Dewsbury

In October 1996 there was a small fire in the bathroom of a dwelling in Dewsbury. The Fire Investigation report indicates that the fire was caused by a lit candle left unattended on an acrylic bath.

9.3 Case Study - Wantage

In January 1999 there was a serious fire in a 3 storey property resulting in two fatalities. A number of nightlights were being used for lighting in the bathroom the evening prior to the fire because of a defective pull cord. The nightlights were left burning all night. The Fire Investigation Report concludes that the fire was caused by a lit nightlight placed at the head end of a plastic bath.

10. FURTHER REFERENCE MATERIAL

Fire Safety Attitudes and Behaviour Monitor (1998)

Fires Associated with the use of nightlight candles - London Fire Brigade (Dave Townsend) Oct 1999

Ignition of televisions by nightlights (Stanger Science) - London Fire Brigade (Dave Townsend) Apr 1996

Time/temperature profiles of burning nightlights (further work) - London Fire Brigade (Dave Townsend) Nov 1998

Fires associated with the use of nightlights and ceramic burners - Consumer Safety Research DTI Jul 1996

November 2000

Research commissioned by Consumer Affairs Directorate, DTI.

Department of Trade and Industry

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