



**REGATTA 1 BUSINESS CENTRE
2 INNOVATION PARKWAY
LAKE KAWANA QLD 4575
Ph. 04 54139210 Fax 07 54 923656 Mob 0447838 034
Web www.sinfon.com.au
Email sinfon@flexinet.com.au**

THE PROBLEMS ASSOCIATED WITH HALOGEN LIGHTS



**A SERIES OF ARTICLES COMPILED FROM VARIOUS
AUTHORITATIVE SOURCES**

Thousands At Risk From Halogen-light Death Traps

The Sunday Age

Sunday July 22, 2007

Mark Russell

THOUSANDS of homes fitted with halogen down lights are potential death traps, with 57 house fires in Melbourne over the past 18 months directly caused by the fashionable lights igniting roofing insulation.

Most worryingly, firefighters warn that as the blazes spread rapidly in the roof cavity, ceiling-mounted smoke alarms are unable to detect the inferno and most residents only become aware of the fire when the roof starts to collapse around them.

Unless tougher regulations on the use and installation of halogen down lights are introduced, it is only a matter of time before someone is killed, the Metropolitan Fire brigade has told *The Sunday Age*.

Two young children almost died in separate blazes when roofs crashed onto their beds while they were sleeping, brigade investigation and analysis unit officer Rod East said.

Melbourne blazes alone have caused an estimated \$17 million damage in the past 18 months.

Halogen lights produce heat of up to 370 degrees at the base. "I don't think people realize the dangers," he told *The Sunday Age*. "We're very lucky no one's been killed in these fires."

MFB officers met representatives of Energy Safe Victoria, the state's statutory independent electricity, gas and pipeline safety and technical regulator, on Thursday to discuss tightening regulations on the use of halogen lights, as many are installed incorrectly and without non-flammable casings.

Mr East said other down lights did not appear to pose the same risk. Home owners needed to use licensed electricians to install halogen lights correctly, ensuring a clear space around them of at least 30 centimetres, he said.

Insulation such as the blow-in variety made from paper pulp was meant to be fire-retardant, but this often lasted only a few years. "There's a lot of subcontractors out there where you really worry about the quality of their product," Mr East said.

"You know they pump it in the morning and at night the joint's burning down."

So far this year, 21 house fires in Melbourne have been sparked by halogen down lights igniting blow-in insulation. This compares to 36 similar house fires last year and 32 in 2005.

Mr East described halogen light fires as "horrific . . . they are burning in the roof before anyone knows".

In the most recent near-fatal fire, a boy aged about 10 became trapped when the roof fell on his bed on his family's first night back in their newly renovated Sandringham home. He scrambled free and a firefighter carried him to safety.

Sustainability Victoria's Roger Kluske said he was shocked by the number of house fires caused by halogen lights.

"Halogens are a bloody nightmare and they're everywhere, in homes, office buildings, cafes . . . The easiest thing to do would be to ban them," he said.

Reported in The Sydney Morning Herald June 26th 2007



HALOGEN LIGHTS LOOK GOOD BUT CAN COST THE EARTH

No designer refit is complete these days without halogen downlights, those tidy little recessed bulbs that make even the daggiest space look deceptively cool. But while they might look sharp, halogen lamps are bad news for the environment. (and your bank book!)

A leaked report from the Victorian Government recently showed a blowout in household energy consumption, with increased emissions from lights - particularly halogens - one of the main culprits.

"Environmentally speaking, they're atrocious," says David Howard, the president of the Association of Building Sustainability Assessors. "They're so inefficient they're more like a heating source than a lighting source. People tend to mistake the fact that halogen is low-voltage for it being low-energy, but that's totally incorrect."

Halogen works on the same principle as an incandescent lamp, which uses electricity to heat a tungsten element until it is white hot. Incandescent lamps are notoriously inefficient, since almost all the electrical energy is converted into heat rather than light. Indeed, the filament gets so hot (about 2500 degrees Celsius) that it literally evaporates, coating the inside of the bulb with tungsten. Eventually - after 750 to 1000 hours of use - a thin spot will appear in the filament, causing it to break and the bulb to "burn out".

Halogen lamps improve on this process only very slightly. They also use a tungsten filament, but it is encased in a much smaller quartz envelope, inside which are halogen gasses. At high temperatures, these gasses combine with tungsten atoms as they evaporate and redeposit them on the filament. This recycling process lets the filament last longer (up to 2000 hours), but it doesn't improve on its basic energy efficiency, commonly expressed in lumens.

"Lumens measure how much light is produced per watt of energy consumed," says Phil Compson, a business development manager for solid state lighting at Philips Australia. "Halogens produce 15 lumens per watt [incandescents produce 10]. Compact fluorescent bulbs are better, at 50 to 60 lumens," LEDs, which have been used in electronics for decades, convert 90% of the incoming electrical charge

into a luminous energy and use only one-eighth of the power of traditional bulbs and less than half that for CFLs. They also last a very long time - up to 50,000 hours."

What, then, is the green renovator to do? Both Howard and Compson suggest LEDs (light-emitting diodes) as the way of the future. They are relatively efficient, with 30 to 40 lumens per watt, with further increases expected.

..."We're on the brink of a major jump from halogen to LED, which should be good news for everyone." Howard says.

Tim Elliott

Power and carbon consumption

- **Halogen lights are inefficient:** Consumer perception is that 12VAC is energy efficient yet **halogen** downlights deliver on average of **only 10 lumens per Watt**, requiring multiple high wattage lamps and contributing many **millions of dollars** in avoidable **cost** to households, businesses and governments.
- **Halogen down lights are responsible for** an estimated **3.3 million tons of CO2** emissions to the atmosphere each year from Australia alone. The scale of this problem has alerted Australia, the USA and other nations to the need for legislation restricting their use.
- **Consumer and industry awareness:** The environmental message is getting through and informed **consumers are making purchasing decisions that will reduce their carbon footprint**, and carbon emission legislation and offset opportunities are getting industry attention.

Dangers of halogen down lights

- Halogen lamps are known to be responsible for fires in excess of 180 home and commercial buildings each year in Australia alone, endangering life and causing millions of dollars of damage thereby prompting restrictive regulations in Australia and overseas markets.

REPRINTED FROM INDICE ECOTECH MARKET OVERVIEW

Halogen lamps

Halogen down lighting is a trendy form of lighting, replacing track lighting as the darling of decorators, particularly in the kitchen, bathroom or in public places such as restaurants, cafes and offices.

The recent concern over halogen lamps has to do with their potential as a fire hazard specifically their propensity to ignite anything within reach that's combustible. In America, where an estimated 30 to 40 million torchiere style halogen floor lamps are currently in use, the lamps have been responsible for some 189 fires and at least 11 deaths since 1991, according to the Consumer Product Safety Commission (CPSC).

Jazz legend Lionel Hampton's home was destroyed when a halogen lamp caught fire. In Albany, New York, a halogen torchiere lamp caused a fire which injured two young

children. And one firefighter died in the blaze at an American university dormitory, which caught fire after a halogen lamp tipped over, igniting a hung tapestry.

In the UK, several fires have started when overhead halogen lights were too close to objects in the room. One such fire occurred, says UK lighting specialist Christopher Wray, when a customer positioned one of his recessed low voltage lights too near a kitchen cabinet.

With halogen ceiling lamps, the main concern is not only what is under the lamps, but also what is above them; fires have started when the lamp is positioned near floor insulation, which is also highly flammable.

Less well known than the fire hazards are the problems of low level radiation. Alistair Philips at Powerwatch says that all halogen lights, whether free standing or embedded in the ceiling, require low voltage transformers (12, 24 or 48 volts) compatible with the voltage of the building (110 in the US; 240 in the UK). "Most of these transformers are cheap and cheerful and usually quite crude," says Alistair. Consequently, the transformers can create pools of strong magnetic fields, three feet below the lights or also above the lights. This is worrying in a kitchen, where the maximum intensity of the field is close to where a tall adult would be standing, but even more so in the room above, which is often a bedroom where people could be sleeping inches away from the embedded ceiling lights of the floor below.

In one instance, Alistair was called to test the electromagnetic fields of a woman who had halogen ceiling lighting in the kitchen of her farmhouse. Alistair discovered horrendous levels of EMFs in her daughter's bedroom, directly above.

One way to reduce the EMFs generated by recessed halogen lighting is to have an electrician run all your halogen lights off one good quality transformer, placed, say, in a cupboard.

A final problem is caused by staring at these high intensity bulbs for too long. The National Radiological Protection Board has produced a leaflet which says that prolonged staring at halogen bulbs can cause a condition in the eye not unlike macular degeneration, which affects central vision. This happened to Alistair Philips when he was filmed by a television production company for 15 minutes and asked to look into a camera with a halogen light whose diffuser was broken. Twelve hours later a black patch appeared in the middle of one of his eyes, which was eventually diagnosed as a central serous retinopathy a blister in the back of his retina. It took a full year before the condition cleared.

If you wish to have recessed lights, you can opt for the new generation of LED lights, which are better for you than fluorescent or halogen bulbs and cost nowhere near as much to run..



Australian Broadcasting Corporation

FOUR CORNERS 2007

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NOTE ON HALOGEN DOWNLIGHTS (Current comments 2010 in [.....])

Reporter Jonathan Holmes follows up on the matter of halogen downlights, in response to audience feedback following his report "The Home Front", broadcast 25 June, 2007.

Reporter: **Jonathan Holmes**



NOTE ON HALOGEN DOWNLIGHTS from reporter Jonathan Holmes

As the program makes clear, "**low voltage**" halogen lights are not low energy consumers. The standard halogen downlight uses 50 watts. The transformer in the ceiling uses a further 10-12 watts. The more modern electronic transformers use less - perhaps 3-4 watts - but that's still extra power consumption on top of the 50W bulb. So every downlight (and many people have eight or ten in a room) is using the same amount of energy as a 60 watt incandescent globe. Ten or 20 years ago the same space would probably have been lit by a couple of 60 watts bulbs, or a fluoro strip using a fraction of the energy. [fluoros use a lot more energy than made out]

The other major problem with any downlights, and halogens in particular, is the effect they have on insulation. It's illegal to lay batts over the top of any downlight, so there will be a gap in the insulation wherever one is installed. This reduces the effectiveness of ceiling insulation quite dramatically. Because halogens (unlike UCFLs and LEDs, see below) give off so much heat, they are more dangerous - although most insulation is fire-resistant or inflammable, there have been housefires caused by insulation catching fire from halogens. Indeed, the Melbourne Fire Brigade recently stated that there had been an average of 30 house fires each year in Melbourne caused by halogens. It's very important to leave at least 150mm of space between a halogen downlight and any insulation material. You can buy special protectors to put around the downlight in the ceiling. Insulation can be packed right up to the protector. But they're not cheap (around \$15 each).

There are viable alternatives for anyone buying a new house or renovating an old one. Ultra Compact Fluorescent downlights cost about \$25 (and the cost is going down) and run on mains power, not 12 volt. They use 9 or 11 watts and technically give almost as much light as a 50 watt halogen.

However, there are drawbacks:

- 1.** Their light is more diffuse and less directional. In practice, therefore, you would usually need a few more UCFLs to do the same job as halogen downlights, particularly in spaces (kitchens, workrooms) where high intensity light is needed. They'd still be much more economical to run.
- 2.** UCFLs don't work on dimmers. You can buy UCFLs which can be progressively switched from 100 per cent to 75 per cent to 50 per cent to 25 per cent brightness by successive switching on and off - a bit clunky but it does the same job as a dimmer. These are a bit more expensive than the standard UCFL.
- 3.** They come in cold white and warm white, but some people find the light they give less attractive than the halogens.
- 4.** They take a while - as much as a minute or two - to attain their full brightness when first switched on from cold. So people tend to switch them on and leave them on all evening, rather than switching them off when they leave a room temporarily. Because they only use a sixth of the power, or less, of halogens this doesn't much matter, but it is a disadvantage. (Mind you lots of people leave their halogens on all evening too, gobbling power.)

These disadvantages are more severe when it comes to replacing halogens with UCFLs in an existing ceiling. Mostly the UCFL bulbs will fit in the halogen fittings; if not, the UCFL fittings should certainly fit in the holes made for the halogens. But they won't give the same light effect if replaced one-for-one. If the halogens are on dimmer switches, the dimmers have to be replaced with straight on-off switches. And the 12 volt wiring and transformer have to be replaced with 240 volt wiring, so an electrician is essential and in inaccessible ceilings it can be a fiddly job. All this makes retrofitting UCFLs a pretty expensive exercise. If you have 50 halogen downlights in your home (and many people have more) you're looking at a minimum of \$1500 to replace them with UCFLs - plus the cost of an electrician.

The other alternative is the LED (light emitting diode) downlight. They are VERY efficient (3-4 watts) [now at 10watts] and VERY expensive (more than \$100 per unit) [now around \$60.00] They are dimmable and they operate on 12 volts, so wiring and switches don't need to be replaced. They fit in the same holes as the halogens. However many LEDs operate only on special transformers so the old ones would have to be replaced. [not necessarily so]

The main snag with LEDs, apart from up-front cost, is that they simply aren't as powerful, yet, as halogens. [they are now or very close to it] They are fine where a low level of light is required, especially if they're going to be used for long periods (outside garden paths, corridors, hallways) but are not yet suitable for work areas and kitchens. [yes they are] In some cases people put LEDs around the edge of a room and keep brighter lights in the areas where they need more light.

The experts say LEDs are coming along in leaps and bounds. Within a very few years they may be a really good replacement option. Right now, they're not quite there. [they are now 2010]

....Apart from that, just remember that if you've already replaced your standard incandescent globes with compact fluorescents, your halogens will using around six times as much power, per light, as any other light in the house - so if you're not in the room, turn them off.

And if you're building or renovating, don't let builders, designers, architects or electricians (many of whom know little and care less about energy efficiency) talk you into installing halogens. Ideally, avoid downlights that involve piercing the ceiling altogether, so that you can insulate the ceiling completely.



Red Alert On Down Light Installation

.... Down lights, illegal wiring, and combustible material can create death traps.

Archicentre, the building advisory service of the Royal Australian Institute of Architects, today warned homeowners and renovators about the deadly fire risk caused by substandard installation of down lights and have issued a national red alert.



David Hallett

Mr David Hallett, General Manager of Archicentre said, "With down lights being a popular, flexible and mood lighting choice for home builders and renovators, extra precautions need to be taken with installation to ensure that heat generated into the roof space does not become a fire hazard when combined with combustible materials."

Victoria's Metropolitan Fire Brigade has reported that thousands of homes fitted with halogen down lights were potential deathtraps, with the lights having caused 57 fires in Melbourne homes in the last 18 months.

Mr Hallett said that many of these residents only became aware of the fire when the ceiling started to collapse. In these cases the smoke alarm would not activate because the fire was above the ceiling - higher than the smoke detector.

Archicentre has received reports of lighting transformers scorching surrounding insulation in ceilings after being incorrectly installed. Often the lighting transformers were found to be in direct contact with the insulation causing overheating and the potential to cause fires.

It is recommended that the halogen light transformers have a clear space around them of a least 300 millimetres to isolate the down light heat source from any potential combustibles including roof insulation or roofing timbers.

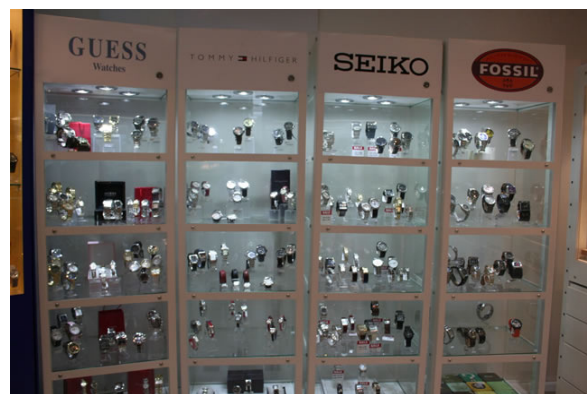
Mr Hallett said the major danger issues surrounding down light installation which need to be considered include:

- If not properly insulated from the wood panelling and ceiling insulation, down lights which can produce temperatures in excess of 300 degrees Celsius at the base, can start a fire that people can't see and that smoke alarms can't detect as it is up in the ceiling above the smoke alarm.
- Common forms of 'blow-in' insulation can create dusting in the attic space that may come into contact with super-heated light fittings, particularly 'low-voltage' down lights.
- The fire retardants in some insulation materials have an effective life of as little as 2 years, meaning that potentially flammable materials may be in contact with high temperature fittings.
- Displaced bulk insulation, or light fittings located too close to timber roof members and roof space litter, can also present a serious fire risk.
- Retrofitted down lights can compromise the one hour Fire Separation Rating in multi-unit developments.

Mr Hallett recommended that homeowners purchase quality halogen down light fittings and that they are installed by licensed registered electrical contractors. Homeowners should obtain a Certificate of Compliance from their electrical contractor if they have any work done.

"We would also urge people considering buying homes with down lights to gain access to the electrical certification to ensure the down lights had been professionally installed."

Whilst down lights are an emerging safety problem for home owners and renovators, illegal wiring and electrical faults also continued to be a general problem for home owners, Mr Hallett added.



While they may seem attractive, halogen downlights have a definite dark side

Over the past decade there has been a dramatic increase in the installation of halogen downlights in new homes. They were first designed to spotlight wall paintings but are now used to light up hallways, kitchens and every kind of room to create a modern look. But halogen downlights are not only an environmental hazard but can also pose a fire risk if not installed properly.

Energy efficiency

Halogen downlights are a type of incandescent lamp, which work by heating a small piece of metal to white heat to produce light. More than 90 per cent of the energy that goes into common halogen lights turns into heat; as a result, the lights use more electricity than needed making them very inefficient.

While halogen downlights are good for direct task lighting, as they provide bright pools of light rather than general illumination, their popularity has exceeded their purpose as they are now being used to light entire rooms. This is achieved by installing a number of lights instead of just one central light source. Halogen downlights also use additional energy as they require the use of a transformer that is usually located in the ceiling above each light fitting. The transformers can use an additional 10 to 30 per cent of the bulb's energy, reducing the overall efficiency of the light fitting even further. The transformers also produce heat, so if they are installed in the roof cavity they may pose a fire risk. This decreases the effectiveness of the insulation in your roof.

Fire danger

In New South Wales, halogen downlights have been linked to 75 house fires in the past five years. In Victoria there have been 57 house fires caused by halogen downlights in the last eighteen months. The fire begins in the roof as the insulation is ignited by the 300 degrees celsius temperatures produced by the light fitting. As the fire is in the roof it often goes undetected by smoke alarms, and residents can be unaware of the fire until the roof crashes in. 'Blow-in' insulation can create dust in the attic space that can act as a fuel if it comes into contact with high temperature light fittings. Light fittings that are located too close to timber beams or roof space litter can also start fires. The wiring rules have changed in response to the number of domestic house fires caused by halogen downlights. New rules require insulation of combustible materials to be kept 200mm from lights and their associated transformers. The distance has increased from 50mm. The new edition of the wiring rules will be published in late 2007. Standards Australia say the new rules should reduce the number of house fires. However, this also reduces the effectiveness of insulation in your roof.

Fixing the problem

There are many alternatives to downlights that are more energy efficient and do not pose a fire risk.

The obvious alternative is to remove some of the bulbs. Downlights are often over installed with many in the one room. Removing downlights is an easy way to significantly cut your energy bill and reduce installation costs.

Another alternative is to replace lamps with wider angle dispersion patterns, as often downlights have a narrow angle that only lights up spots on the floor rather than an entire room. A light with a 60 degree angle will help to efficiently light a room. You can also replace lamps with those of a lower wattage. Most downlights are fitted with

50 watt lamps; these can be replaced by 20 to 35 watt lamps. However, buying the cheapest option is not the best solution, as the cheapest lamps are usually the least efficient and the shortest lasting. A more expensive lamp can produce more light for the same energy use and will generally last a lot longer.

A complete change of lamps is an option which may require some time and money in the short term, but in the long term will largely reduce lighting costs by increasing energy efficiency. An emerging technology is LED downlights which cost between \$30 and \$100 but last 50,000 hours.

Sanctuary magazine Issue 4



***Red Alert on Insulation and Down Lights
.... Down lights, illegal wiring, and combustible material can create
death traps.***

The massive insulation boom boosted by the Australian Government's Energy Efficient Homes Package to install ceiling insulation in up to 2.9 million Australian homes has prompted a red alert warning from Archicentre, the building advisory service of the Australian Institute of Architects over the deadly fire risk caused by the installation of insulation and down lights.



The fire in this home started in the roof cavity above the smoke detector placed in the ceiling

Mr Angus Kell, ACT & NSW State Manager of Archicentre said with down lights being a popular choice for many home builders and renovators, extra precautions need to be taken with the installation of insulation to ensure that the heat generated into the roof space from the down light does not become a fire hazard when combined with combustible materials.

"Thousands of homes fitted with halogen down lights can become potential deathtraps if they are not fitted correctly leading to potential fire hazards in a home."

Mr Kell said in some house fires many of these residents only became aware of the fire when the ceiling started to collapse. In these cases the smoke alarm would not activate because the fire was above the ceiling - higher than the smoke detector.

Archicentre has received reports of lighting transformers scorching surrounding insulation in ceilings after being incorrectly installed. Often the lighting transformers were found to be in direct contact with the insulation causing overheating and the potential to cause fires.

It is recommended that the halogen light transformers have a clear space around them of a least 300 millimetres to isolate the down light heat source from any potential combustibles including roof insulation or roofing timbers. It is also recommended that down light safety guards are installed over the down light.

Mr Kell said the major danger issues surrounding down light installation and insulation installation which need to be considered include:

- If not properly insulated from the wood panelling and ceiling insulation, down lights which can produce temperatures in excess of 300 degrees celsius at the base, can start a fire that people can't see and that smoke alarms can't detect as it is up in the roof cavity above the smoke alarm.
- Common forms of 'blow-in' insulation can create dusting in the attic space that may come into contact with super-heated light fittings, particularly 'low-voltage' down lights.

- The fire retardants in some insulation materials have an effective life of as little as 2 years, meaning that potentially flammable materials may be in contact with high temperature fittings.
- Displaced bulk insulation, or light fittings located too close to timber roof members and roof space litter, can also present a serious fire risk.
- Retrofitted down lights can compromise the one hour Fire Separation Rating in multi-unit developments.

THESE LIGHTS CAN DEMOLISH YOUR HOME

Sun Herald

Sunday July 22, 2007

By Daniel Dasey and Mark Russell

AUSTRALIA'S peak building advice body, Archicentre, has warned renovators to take care when installing halogen lighting systems after evidence that some devices are overheating and causing fires.

Victorian firefighters warned last week that thousands of homes fitted with halogen downlights were potential deathtraps, with the lights having caused 57 fires in Melbourne homes in the past 18 months.

Archicentre NSW manager Angus Kell said he was not aware of halogen lights causing fires in NSW but would "not be surprised" if they had.

The body had received accounts of lighting transformers scorching surrounding insulation in properties after being incorrectly installed.

There were also concerns about the quality and safety of cheaper transformers imported from Asia, he said.

Problems could arise when halogen lights were installed after insulation was fitted in roofs. Some home owners were simply cutting a hole in their roof and shoving the lighting transformer inside, putting it in direct contact with the insulation. This could lead to overheating and potentially cause fires, he said.

Mr Kell advised would-be renovators to clear away insulation before installing a transformer in the roof, and to buy quality halogen systems.

A NSW Fire Brigades spokesman said he was not aware of any particular problem posed by halogen lights.

Victoria's Metropolitan Fire Brigade (MFB) said many families who lost their homes only became aware of the fires - which caused an estimated average damage bill of \$300,000 - when the roof started to collapse.

In these cases, smoke alarms would not activate because the fire was above the ceiling.

