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## RECOVERY OPPORTUNITIES ARISING FROM HALOGEN BULB AND TORCHIERE-STYLE LAMP FAILURES

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### I. INTRODUCTION

The torchiere-style residential floor lamp is a sleek, decorative, inexpensive appliance with almost universal appeal. It is also one of the most common fire hazards of our time. The standard 200-watt bulb reaches temperatures in excess of 1000°F, comparable to an open flame.

The hazards associated with such lamps have been publicized since an industry-wide recall in 1996. Halogen lamps are no longer sold with the intensely hot 500-watt bulb, known to ignite materials even without direct contact. The recall advised consumers to remove such bulbs and replace them with a wattage no higher than 300 watts. In addition, the industry improved the design of the lamps by requiring a glass protector above the bulb and a metal guard at the top of the lamp to prevent curtains and other combustible materials from directly contacting the bulb. Many college campuses have banned the use of the lamps in dormitory buildings. Even some retailers have discontinued selling the lamps.

Nonetheless, many of the first generation designed lamps continue to operate in homes and businesses throughout the country. Indeed, the re-designed lamps continue to present fire hazards. They are also sold at ever decreasing prices, placing more and more structures and families at risk. Ironically, the growing awareness of the hazards of these lamps is often the industry's primary defence when claims are asserted against them. The

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consumer should have known of the risk, they will argue, and should have used greater caution. The following discussion is intended to assist in proving manufacturer responsibility and to overcome certain defences.

## II. DETERMINING THE FAILURE MODE

### A. Initial Investigation

Successful litigation of a halogen lamp case is directly related to the quality of the initial investigation. Determination of the particular failure mode often depends on the extent of damage caused by the fire itself and/or by the fire-fighting efforts, in addition to the experience and skill of the fire investigator. Ideally, the lamp should not be moved from the position in which it was found at the time of the fire. If it has been moved, efforts should be made to interview the firefighters as early as possible to ask how the lamp was positioned upon their arrival. Burn and soot patterns in the room of origin may indicate whether the lamp fell prior to, during, or after ignition. IF the bulb is missing, broken or shattered, the investigator should search for the remains using a fine mesh screen, if necessary. The bulb remnants can be important in identifying the manufacturer and in ascertaining the wattage.

### B. Possible Failure Modes

#### 1. *Bulb Contacts Nearby Combustibles*

Even after the 1996 recall and its attendant protective measures, the torchiere-style lamps are not safely designed. The fixtures still will accommodate a 500-watt bulb. The guard and glass protector are not designed to prevent small insects from approaching and accumulating at the bulb, to which they are naturally attracted, or a small child from throwing objects at the concave shade, such as plastic toys or articles of clothing. Even the modified lamps have been known to fail Underwriter's Laboratories "cheesecloth test". Cheesecloth is considered highly flammable. Nonetheless, it should be able to withstand up to seven hours of close contact with a light bulb (*ie.* on top of the lamp shade or guard) without ignition. Independent testing, however, shows that many of these lamps will ignite a double layer of cheesecloth in a matter of mere seconds when draped on top of the lamp.

Added to the hazard of a fire at the shade or guard is the fact that most torchiere-style lamps have a translucent, plastic decorative piece where the shared contacts the stem. Witness accounts indicate that once ignited, the plastic material can melt and form flaming molten globules dripping down to the base, where combustible materials may be present.

## 2. *Lamp Tips Over*

All lamps can fall is knocked down by children or house pets. Torchiere-style lamps are particularly susceptible to tip-over because of the low ratio of base size to height. If a house pet tips the lamp over and the bulb remains illuminated, the intense heat from a halogen bulb can cause a fire almost immediately. Torchiere-style lamps typically are placed near a bed or couch. If the bulb lands on or near the fabric curtains of such furniture, a fire will inevitably result.

## 3. *Bulb Failure*

Fire may be caused from a failure of shattering of a bulb's tube. There are two ways a fire can ignite from the tube: the "burn-out" mode of failure and the "exploding bulb" phenomenon. Understanding either mode of failure requires an understanding of how the bulb is constructed and how it operates.

The light bulb consists of a high heat resistant glass tube, typically made of quartz (silicon dioxide). Its filament is a tungsten steel coil. The flattened ends on each side of the quartz tube act as a thermal insulator. The halogen gases inside the tube are pressurized and may include one or more of the following: iodine, bromine, chlorine and bromine. Hydrogen may be added to inhibit the reactivity of the halogens. Each manufacturer mixes the gases differently.

Normally, the tubes fail without incident. They simply go out, like a normal light bulb, because the filament breaks. Theoretically, a tungsten filament never should break because it goes through a regenerative process. Tungsten particles actually evaporate while the filament emanates light and heat. The gaseous tungsten fuses with the halogen gases and then flows back to regenerate the tungsten – keeping the filament intact. In reality, however, this process eventually wears out the filament, because no filament can be perfectly constructed. Filament always will have minor imperfections, typically thin spots along the filament wire where the tungsten filament gives off greater heat due to higher resistance and lower radiation capacity, eventually leading to failure at those locations.

### a. Connector arcing

Occasionally, the bulb will fail before the filament breaks, as in the "burn-out" failure mode. This happens when long-term heat exposure weakens the spring pressure that keeps the bulb secured within the metallic contactor bracket. Weakened bracket pressure loosens the contact, and the loose connection causes resistance heating which can lead to pitting (oxidation) and arcing of the metal surfaces. A high resistance contact point can generate even more heat. A symptom of this is that the light flickers or sporadically goes on and off.

b. The “exploding tube” phenomenon

A filament failure can sometimes lead to the “exploding light tube” phenomenon. The glass tube shatters and, in some cases, so does the glass shield over the tube. Hot glass fragments can ignite combustible materials several feet away. This occurs because the pressure level inside the tube increases as the heat increases – a bulb with a surface temperature of 1000°F endures internal pressure of 768 psi. Factors contributing to the “exploding tube” phenomenon include: (1) over-pressurization of the halogen gasses inside the bulb when manufactured; (2) flaws in the bulb itself; (3) hot spots on the bulb from skin oils or other residue; (4) extra flaws in the filament causing increased heat in the tube and thus increased pressure when the bulb is activated; (5) varying dynamics in the filament break, depending on the extent and duration of the arc, and/or (6) the explosive nature of the gases once released to the atmosphere causing increased propulsion of the glass. Sometimes, the shatter is minor, leaving portions of the glass tube and its filament intact. Other times, the filament vaporizes entirely from an extended arc. If the mode of failure is rupture of the bulb itself, the investigator should sift carefully through the debris with a fine mesh screen for evidence of glass shards, filament and/or pitted contactors.

#### **4. *Power Cord Failure***

The power cord to the tochiere-style halogen lamp typically extends four feet out from the base. It also runs along the interior of the nearly six-foot stem to the socket contained in the shade. The stem typically consists of three 22-inch parts, the lower stem, middle stem and upper stem. These are screwed together by the customer during the assembly process. Occasionally, the cord may be crimped, twisted or abraded in such a way that the cord is susceptible to corrosive attack and/or high resistance heating, leading to electrical arcing. If the cord damage is hidden within one of the stem parts, there is no way for the consumer to have known of this defect.

#### **5. *Switch Failure***

A poorly manufactured switch may cause resistance heating and arcing at the connections within the switch, which can ignite the insulation of the cord within the stem. If combustible materials are nearby, the fire can spread. In addition, most older-model halogen lamps have a small dimmer switch at the top stem that turns on and brightens the light when turned clockwise and dims the light and shuts it off when turned counterclockwise. Consumers are often unaware that the lamp is still on when turned to the lowest level. A constantly energized bulb can increase the likelihood of failure. To avoid this problem, many of the switches have been altered from dimmers to clickers that click to three levels of brightness when turned clockwise and shut off at the fourth click. A counterclockwise turn produces no effect. But this unusual and unconventional design can confuse the user. For example, if there is a bad connection in the lamp causing a delay in illumi-

nation, the user who clicks the switch might reasonably think the switch is still in the “off” mode. The user may then leave the room believing the lamp is turned off, only to find later that the bulb had eventually illuminated. Again, such an extended illumination of the bulb increases the hazards associated with it.

### III. LEGAL STRATEGIES

#### A. Determining the Responsible Party

The increasing trend in the industry is to leave no manufacturer insignia whatsoever on the lamp, other than, perhaps, the country of manufacture – typically somewhere in Asia. The packaging and product literature on the lamp are often discarded by the consumer or destroyed in the fire. However, almost all torchiere-style halogen lamps bear a small blue oval-shaped label from the Underwriter’s Laboratories of Canada (“ULC”). The ULC label will have an issue number on it. Unfortunately, the label is typically placed inside the shade- the area likely to sustain the worst burn damage in the event of a fire. But if the label is still legible, the issue number can be used to trace the manufacturer by calling ULC at 1- (866)-937-3852 or logging onto ULC’s website at [www.ulc.ca](http://www.ulc.ca). The website is somewhat difficult to surf, but persistence will eventually pay off.

In the absence of the labeling information, it is critical to obtain from the customer all available information about the history of the lamp – where, from whom, and how it was purchased (*e.g.* credit card, check or cash). The store may then be able to trace the distributor or seller. In many provinces, the retailer often will be a potentially responsible party as well. It may be important to establish whether the halogen bulb came with the lamp or was purchased separately. The investigator should also try to learn from the person who actually installed the bulb whether gloves or paper were used during the installation to prevent skin oils from being deposited on the lamp.

#### B. Overcoming Potential Defences

Occasionally, the evidence clearly points to a manufacturing defect, such as an exploding bulb. If the fire occurred from the bulb igniting nearby combustibles, issues of comparative fault are likely to be implicated. Even in the “exploding bulb” cases, the manufacturer may attempt to blame the customer by claiming that the bulb was installed without gloves, leaving skin oils on it. The manufacturer may allege consumer abuse or misuse. Manufacturers will also rely on warnings and disclaimers in their product literature or on the product itself, seeking to avoid any implied or express warranty claims. Even in such situations, some or all of the following theories of liability may be applicable.

## *1. Express or Implied Warranties*

In most provinces, legislation will allow a purchaser to hold a retailer or manufacturer liable for breach of contract where the purchaser is sold a defective or dangerous product. For example, Ontario's *Sale of Goods Act*, R.S.O. 1990 c.S-1 provides that the purchaser of a product will, in many cases, be deemed to receive an implied warranty from the manufacturer and/or retailer that the product is fit for its purpose and free from defects. A sound argument generally can be made that a halogen lamp is defective given (1) its ability to radiate heat in excess of 1000°F and (2) the likelihood of combustible materials eventually coming into proximity with the lamp.

## *2. Negligent Design*

Many times, the facts indicate that something burned at the top of the lamp, but the user will state that nothing was placed there. The fire investigator may often point out that something had to be up there. Does this mean the user is lying? Not at all. The design of the lamp lends itself to the accumulation of small objects at the shade, without knowledge or awareness of the occupant.

Unlike most other lamp styles, the torchiere-style halogen lamp has a concave shade at the top, shaped like a right-side-up bowl. Any small object placed in that area will remain there, until removed or burned away. The most common objects to accumulate in the shade are insects. Most homes have insects, even if we rarely see them. Many insects are attracted to light. Halogen lamp shades virtually collect insects. The bowl shape is also an attractive target for young children, prone to throwing objects – especially when parents are not looking or if the lamp is in their room. The accumulation of insects and/or other foreign objects poses a significant fire hazard in view of the intense heat generated by a 300-watt halogen bulb.

In addition, the shade typically has a plastic decorative piece at its bottom, just underneath the bulb. Once a fire starts in the bowl-shaped shade, the flaming material will drop down to the plastic piece, melting it. Once the plastic melts, the fire is likely to spread beyond the lamp itself.

The design of the lamp actually attracts accumulation of foreign objects; this deficiency can be an effective means to deflect the defences of alleged misuse or contributory negligence.

## *3. Negligent Failure to Warn*

Most halogen lamps are sold with warnings in the product literature or on the box. The lamps themselves may have warning labels near the power cord plug and/or inside the shade. However, certain dangerous characteristics of the lamps may be set-off without warning, including the tendency of foreign

materials (e.g. insects, toys, clothing etc.) to accumulate and ignite in the shade area, the heightened risks when left unattended with children or pets, and the propensity for the plastic decorative piece to melt and burn, spreading a resulting fire.

In addition, the bulbs – though containing a warning against skin contact – frequently do not clearly state why it may be dangerous to touch the bulb. The consumer is left to surmise that the bulb will simply provide less light or burn out more quickly. There is no reason for a user to think that skin contact may cause the bulb to explode, shatter and spread hot shards to nearby combustibles.

As long as the consumer can state that with the proper warning he or she would not have purchased the product or would have used it differently, the seller should bear liability for failure to provide necessary and adequate warnings.

#### IV. CONCLUSION

Halogen bulbs and torchiere-style lamp failures present excellent recovery opportunities, but their successful pursuit requires a thorough, timely and effective investigation. Cozen O'Connor's expertise and experience in handling numerous such claims is available to be deployed for the benefit of your company to explore subrogation recoveries for these claims.

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