In North America, we’ve benefitted from the emergence of some energy saving superheroes. As LED technology has quickly grown, energy use from lighting continues to decrease. But as adoption of energy efficient technologies has resulted in significant savings, the recessed luminaire air leakage villain continues to steal from us.

Losses from air leakage can be significant. Known as the chimney or stack effect, air will move through recessed luminaire seals, seams and other small openings when there is a temperature or pressure difference between conditioned and unconditioned spaces. Tiny holes or gaps equaling a 0.5 in. diameter opening can result in a loss of 2 cfm.

One of the drivers for energy conservation requirements is the Energy Conservation and Production Act (ECPA), enforced by the U.S. Department of Energy (https://www.energycodes.gov/about/statutory-requirements).

The International Energy Conservation Code (IECC), the California Energy Commission (CEC) Building Energy Standards (Title 24, Part 6) and ASHRAE Standard 90.1 are designed to meet or exceed the requirements in the ECPA.

Code authorities are increasingly turning to these energy codes for guidance in reducing energy losses. According to the International Code Council (ICC), the IECC is currently in use in or adopted by 47 states, the District of Columbia, the U.S. Virgin Islands, New York City, and Puerto Rico. It is also the basis of many international energy conservation codes.
As required by California law, CEC Title 24 was enacted in 1978 by the California Building Standards Commission to reduce energy use and greenhouse gases. It applies to all building occupancies in California and covers 16 climate zones. The current edition is dated 2016 and is on a triennial revision cycle.

Both IECC and CEC Title 24 require recessed luminaires that penetrate the building (thermal) envelope to be Type IC-rated and bear a label that certifies that the luminaire does not permit air leakage in excess of 2.0 cfm (0.944 L/s) when tested in accordance with ASTM E283 at a pressure differential of 1.57 psf (75 Pa).

Section 410.6 of the National Electrical Code (NEC) requires luminaires to be listed. UL Listing covers the evaluation for safety in accordance with ANSI/UL 1598, Type IC Luminaire

Luminaires marked “TYPE IC” may be installed such that insulation and other combustible materials are in contact with, and over the top of, the luminaire. Type IC luminaires are provided with thermal protection to deactivate the lamp should the luminaire be mislamped.
Air Leakage (continued)

the Standard for Safety of Luminaires, and other applicable safety standards. To evaluate luminaires for air leakage, UL also offers performance certification to ASTM E283 for compliance with IECC and CEC Title 24 requirements. Products certified by UL and found to comply with both safety and performance requirements will bear an enhanced mark as shown in Figure 1.

Additional Information
For more information on luminaire air leakage testing or using UL Product Spec, please contact Rich Berman at Richard.Berman@ul.com or +1.847.664.2554.

Frequently Asked Questions

Is air leakage certification required?
Yes. Certification is required to demonstrate compliance with the International Energy Conservation Code (IECC) and California Energy Commission (CEC) Title 24, Part 6. Products certified for safety only may be rejected by AHJs.

If a UL Certified luminaire is marked “air tight,” does that signify that UL certified it for compliance with ASTM E283?
No. The term “air tight” does not appear as part of the UL certification markings. Look for the UL Certification Mark that specifies both SAFETY and PERFORMANCE as well as the statement “Also Certified to ASTM E283.”

Where can I locate the UL Guide Information for these product categories?
The easiest way is to visit www.ul.com/productspec, the next generation of the UL White Book. Product Spec is a powerful free resource for the electrical professional. From the main page, select “UL Product Category Code” and enter one of the 4-digit alpha codes shown above and hit “search.” Searching by “Product Type” or by “Products, Systems, or Assemblies” are other convenient options.

From there, users can view the UL guide information for the product category (click on “Show additional information” to see the full guide) as well as view the list of all manufacturers with current UL certifications in a category. The scope of the UL Standard is also available for viewing as well as technical publications in some product categories.

Is air leakage testing to ASTM E283 have any correlation or similarity to CCEA (City of Chicago Environmental Air) or IP (Ingress Protection) ratings?
No. These are unrelated to IECC and CEC Title 24 requirements.

Is air leakage certification at UL limited to LED luminaires?
No. UL can also certify other products for air leakage including:
• IEVV – Fluorescent Recessed Luminaires
• IEZX – Incandescent Recessed Luminaires
• IFAO – Light-emitting-diode Recessed Luminaires
• IFDR – Low-voltage Lighting Systems, Power Units, Luminaires and Fittings