

PRODUCT APPLICATION

A technical bulletin for engineers, contractors and students in the air movement and control industry

UL Product Safety Certification in Air Movement and Control



Underwriters Laboratory or UL Solutions is a leading organization that creates standards and performs tests on products to ensure they meet those standards. UL is a Nationally Recognized Testing Laboratory (NRTL) and has developed more than 1700 safety standards approved for use in the US and Canada. This article is a summary of what you should know about UL and the air movement industry.

UL History and Relationship to Other NRTLs

Underwriters Laboratories was established in 1894 as a not-for-profit organization with the mission to reduce bodily injury, loss of life, and property damage resulting from product-related mishaps. Their mission is two-fold, with the first being developing standards for safety. UL representatives work with industry organizations, manufacturers, and the government to establish realistic, workable safety standards both within this country and internationally. Standards developed by UL are also used by other NRTLs such as Intertek Testing Services (formerly Edison Testing Laboratories (ETL)). The main difference between UL and ETL-listed products is that ETL doesn't create its own standards for certification. UL develops standards that are used by other organizations including ETL. Both are NRTLs that serve as non-governmental labs that operate independently.

The second part of UL's mission is product and component testing. Products include many types of materials, equipment, construction, and systems that are investigated scientifically to evaluate their electrical, fire, and safety hazards. In addition to testing and certifying products as complete units, UL investigates individual components. All tested and recognized components are listed in the [UL Certification Database](#).

Follow-Up Inspections

After a manufacturer has a product or products UL Listed, UL inspectors make unannounced visits to the factories where these products are produced. During these visits, they review the manufacturers' production controls and record keeping, witness production tests, and inspect completed products as well as the components. The unannounced visits assure that UL Marks are applied only to products that meet UL requirements. A minimum of four visits per year are made to all manufacturers producing UL Listed products.

UL Listings Defined

This section focuses on the individual UL Listings, the standards, and the testing behind these listings. The UL listings discussed in this section are limited to air movement product types manufactured by Greenheck and its competitors with similar products. This information is useful in making determinations on what listings are available and can be specified for the different product types.

Caution: Do not assume that all products will automatically be UL Listed and bear the UL Mark. Your requirements should be specified.

UL 705 - Power Ventilators

UL 705 is intended to assure the buyer of the safety of electrical components and connections within power ventilators (roof and wall-mounted) and duct fans (straight-through type). This standard is limited to fans for commercial or industrial use for connection to permanently installed wiring systems that meet NFPA 70 and the National Electrical Code (NEC). This listing does not include fans used where heat, grease, corrosive or flammable atmospheres where dust, material, or refuse are present.

Tests under this standard relate to the extremes of current, temperature, fuses, motor windings, bearing temperatures, and water that the fan could be subjected to. Most fans and non-tempered make-up air units are offered with UL 705.

UL 705 – “Supplement SC” – Power Ventilators for Restaurant Exhaust Applications

Supplement SC within UL 705 concerns the safety of roof or wall-mounted power ventilators used with restaurant exhaust appliances, where heat and grease are typically encountered in the airstream. These fans must also be installed in accordance with NFPA 96.

Basic testing is the same as for UL 705 and additional testing includes operating the fan in a high-temperature airstream without warpage, deterioration, or damage that would cause the fan to operate unsafely plus grease flare-up tests. Greenheck products listed for restaurant exhaust include most centrifugal roof upblast and sidewall fans, utility fans, and housed centrifugal fans.

UL 705 – “Supplement SD” – Power Ventilators for Smoke Control Systems

Fans installed as part of a smoke control system are listed under this standard. They must be installed in accordance with NFPA 92A (Recommended Practice for Smoke Control Systems) and 92B (Guide for Smoke Management Systems in malls, atriums, and large areas).

Ventilators shall be tested to a temperature and time rating specified by the ventilator manufacturer. Fans available with this listing include axial and

centrifugal roof upblast fans, centrifugal power roof ventilators, and axial inline fans.

UL 507 – Electric Fans

This standard applies to two categories of nonindustrial fans and blowers: one, those used for air circulation such as desk and ceiling fans; and two, fans used for ventilation such as attic, ceiling insert, wall, window, and household hood fans. Fans in this category must be installed in accordance with NEC.

Effective November 2024, UL 507 requirements will change to require additional end-of-life testing to ensure the function and safety of the fans’ thermal protection. All products manufactured after November 2024 are subject to these requirements if they are certified to UL 507.

Testing is similar to UL 705 with an additional starting current test, humidity conditioning test, and test for use with optional speed controls. Greenheck ceiling and cabinet fans are available with UL 507.

UL 710 – Exhaust Hoods for Commercial Cooking Equipment

Exhaust hoods installed over commercial cooking equipment are covered by this standard. Hoods are either UL Listed with fire dampers or listed without fire dampers. Hoods with fire dampers protect ductwork and maintain duct temperatures below 375°F.

Test conditions include high temperatures, cooking smoke and flare-ups, abnormal flare-ups, burnout, fan failure, and fire.

All of Greenheck’s kitchen hoods except Models GC and GO are available with UL 710.

UL 555 – Fire Dampers

Fire dampers are tested in accordance with this standard and are rated for fire resistance at 1-1/2 or 3 hours intended for use in HVAC duct systems passing through fire-resistive walls, partitions, or floors to be installed in accordance with NFPA 90A. They must also be installed in accordance with the damper manufacturer’s installation manual and applicable model codes such as the International Building Code (IBC), International Mechanical Code

(IMC), and International Fire Code (IFC), as well as local building codes.

Testing includes repeated operation, salt spray, fire endurance, and hose stream. All Greenheck fire dampers are listed or classified under UL 555. Combination fire/smoke dampers are also classified under UL 555 as well as UL 555S. Greenheck ceiling radiation dampers are certified under UL 555C.

UL 555S – Leakage-Rated Fire Dampers for Use in Smoke Control Systems

This standard governs smoke dampers which are intended to prevent the spread of smoke when HVAC systems shut down during a fire emergency and those which control the movement of smoke within a building when the HVAC system functions in a smoke control mode. Also, leakage-rated dampers are intended for installation in accordance with NFPA 90A.

Testing includes salt spray, repeated operation, elevated temperature, leakage, and operation while under airflow. All Greenheck smoke dampers and combination fire smoke dampers are classified under UL 555S.

UL 555C – Standard for Ceiling Dampers

This standard covers ceiling dampers that are intended for installation in hourly-rated fire-resistive membranes (floor/ceiling or roof ceiling assemblies). Testing includes fire endurance tests, closing reliability, dust loading, and salt-spray testing. All Greenheck ceiling radiation dampers are covered by UL 555C. Ceiling dampers intended for use in combustible (wood) assemblies must also undergo a UL 263 or ASTM E119 full-scale fire test. Greenheck has specific ceiling radiation damper models which meet these requirements.

UL 1812 – Standard for Ducted Heat Recovery Ventilators

This standard covers ducted heat recovery ventilators intended to remove air from buildings, replace it with outside air, and in the process, transfer heat from the warmer to the colder air.

Units are intended to be connected to duct systems that interconnect rooms or spaces within buildings

for exhausting the indoor air and/or distributing the outdoor air. UL 1812 requires units to be tested for construction, performance, and some manufacturing and production tests.

Some of the tests that are performed include input tests, motor overload tests, dielectric voltage-withstand tests, insulation resistance tests, overvoltage and undervoltage tests, short circuit, rain, and gasket. Greenheck's energy recovery ventilators without heating and cooling are listed to UL 1812.

Additional UL Considerations

Product Construction: In addition to the testing outlined for each listing, UL also judges products by their construction. In other words, listings won't be granted unless products are formed and assembled so that they will have the strength and rigidity necessary to resist the abuses to which they may be subjected without increasing the risk of fire, electric shock, or injury to personnel.

Motors: For fans to qualify for UL Listings, the manufacturer must furnish UL with a complete outline of all the motors to be used with that product. This outline of motors is specific to each fan model and fan manufacturer.

Motors must be listed by motor manufacturer, manufacturer's model number, speed, horsepower, and enclosure type. UL Marks can only be applied to a specific fan model using a motor on the specific outline for that product.

So, what does this all mean? It means that customers must accept standard motors when UL Listings are required. It may also limit a customer specifying a brand's motors or motors with special features.

One example of the above is fans requiring explosion-proof motors. UL does not have a program for listing explosion-proof fans. Therefore, explosion-proof motors will not appear on the motor-approved list. You can use Greenheck's Computer Aided Product Selection (CAPS®) program to select fan and motor combinations to assure that a given product is available with a UL Listing.

UL Marks and Label Information

(Reference www.UL.com for more information on the UL Mark.)

A customer can verify the product received is UL Listed or Classified by looking for the UL Mark on each product. UL allows the Mark, and the label that contains the Mark, to be applied in various sizes, methods, and layouts. Following are examples of the most common UL Marks used on air movement and control products and information that appears on the label. Please pay particular attention to the label example showing additional information.



This is the basic and most common UL Mark. UL Marks must be applied in a legible size.



This is the Canadian UL Mark. Many Greenheck products having U.S. approval are also evaluated to Canadian safety requirements (which may differ from U.S. requirements). For

U.S. and Canadian Listed products, this Mark will appear to the left of the U.S. Mark.

This mark can also be used for products complying with both U.S. and Canadian requirements.

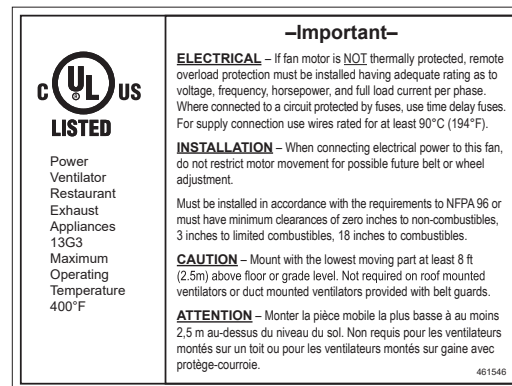


UL Classified Marks are applied to products that are evaluated for specific properties, a limited range of hazards, or products suitable for use under limited or special conditions. Products

such as fire dampers and fire doors fall into the classified category. Classified Marks can also pertain to individual U.S. or Canadian Marks.

This is an example of the label applied to a Greenheck product with a UL 705 Supplement SC Restaurant Exhaust Listing. Labels applied show the Mark, as previously discussed, plus the word Listed and the subject of that listing. In this example, the subject is Power Ventilators Restaurant Exhaust Appliances. It's important to note that the UL standard number is not printed, only the subject.

Part/No: 461546
Related Engr. Drwg. 2012555



The code 13G3 shown is the control number assigned to Greenheck by UL for this subject. Additional information on electrical and installation must also be shown. However, the manufacturer can choose to print this on a separate label. Greenheck assigns part numbers to each label (#461546 in this example) to control that only the product, (and their selected options, such as motors) that qualify will receive the label.

This is just one example of the many label formats and information. Other products and UL listings may require additional information. For instance, the label applied to classified fire dampers must include individual serial numbers and references to specific installation instructions.

Greenheck's Commitment

Visitors that tour Greenheck facilities can see our commitment to product testing for both performance and safety. Greenheck has test facilities, equipment, and personnel dedicated to the testing required by UL. Because of this commitment, Greenheck has the advantage of being part of UL's Client Test Data Program. To become a member of this program, UL conducts an extremely thorough audit of facilities, equipment, workforce, training programs, compliance records, and the history of previously certified products. As a member of this program, Greenheck is allowed to do its own UL testing for specific UL standards. Test data and all supporting evidence is sent to UL for their approval. In addition, having these facilities and equipment allow Greenheck to have tests witnessed at Greenheck facilities by UL personnel.

Greenheck has a clear advantage when it comes to motor testing. Greenheck has a dedicated motor test area (for UL 507 and UL 705 testing). This laboratory is fully equipped with various test stands and dedicated data acquisition systems for complete motor testing. Another example of Greenheck's commitment is a UL-approved test furnace which allows us to test life safety products efficiently and get newly listed damper products to market sooner. Greenheck is also the leader when it comes to UL testing on Power Ventilators for Smoke Control Systems as the first in the industry with a UL Listed inline fan for smoke control systems.

Greenheck is dedicated to providing the broadest offering of UL Listed quality products in the industry—products that withstand rigorous testing, ensuring your customers safe, reliable products. If safety is a concern, Underwriters Laboratories and Greenheck products are the answer.