FIRE EQUIPMENT MANUFACTURERS' ASSOCIATION

RESTAURANT FIRE PROTECTION – UL 300

1. UL 300 is a:
   A. Code
   B. NFPA Standard
   C. Law
   D. UL fire test standard for manufacturers of pre-engineered systems.

   Answer: D

   UL 300 is a fire test procedure written by UL to ensure that all manufacturers are performing the same fire tests, in the same manner, in order to list their products with ULI.

2. What was the primary reason the UL 300 test standard was revised?
   A. More revenue for UL, manufacturers, and distributors.
   B. Improve cooking appliance protection.
   C. Improve duct and plenum protection.

   Answer: B

   The changes in the standard specifically addressed cooking appliances in an effort to provide test protocols that more closely reflect real world fire risks. The evolution of these appliances over the years created a far more challenging fire hazard as appliance manufacturers strive for improved performance. Cooking methods had changed significantly and stricter fire testing had become necessary to validate fire protection systems reliability.

3. What cooking appliances were affected by UL 300 test protocol changes?

   Answer: Fryers, griddles, ranges, charbroilers (gas radiant, electric, lava rock), woks.

   UL 300 did not change plenum, hood, and duct test protocols, and did not affect charbroilers (upright broilers charcoal, or mesquite).

4. The real-world fire hazards accounted for in UL 300 were the use of newer "high efficiency" cooking appliances, detector reaction time prior to fuel shut-off, and the use of vegetable shortening rather than animal fat. True or False?

   Answer: True

   The three major changes in fire testing included:

   - The use of commercially available appliances that met specific heat up and cool down rates.
   - The use of vegetable shortening with more severe burning characteristics (auto-ignition temperatures of 685ºF or higher).
   - Continued operation of the fuel / heat source during a two-minute pre-burn time instead of turning the appliance off prior to a one-minute pre-burn.

5. On average, how much more wet agent is required to list fryers to the UL 300 fire test protocol?
   A. 3 times more
   B. 5 times more
   C. 7 times more

   Answer: B

   Although each manufacturer's system is different, on average five times more agent is required for protection of fryers. Additionally, the quantity of agent required in order to achieve a listing on the remaining cooking appliances increased significantly as well. Changes discussed in Question 5 result in a more intense fire that is difficult to extinguish and far more difficult to secure against reflash.

6. What UL 300 test protocol changes were made to improve *(example)* fryer protection?
   A. Test appliance requirement was changed from a fabricated pan *(to simulate a fryer)* to a commercial gas fryer with specified heating and cooling rates.
   B. One-minute pre-burn after auto-ignition was changed to two minute pre-burn.
   C. Appliance fuel-off condition during pre-burn was changed to appliance fuel-on condition.
   D. Minimum grease auto-ignition temp of 685ºF was added.
   E. All of the above.

   Answer: E

   The combination of all of these changes presents a much more difficult fire test, which in turn improves life safety conditions in real world applications. While previous standards provided a means to determine fire systems capabilities, significant education and investment was required by manufacturers of systems, to understand fire behavior and system capabilities associated with the more realistic new testing standard.

7. UL 300 requires splash tests for which appliances?
   A. Fryers
   B. Range Tops
   C. Griddles
   D. Woks

   Answer: A, B, D

   Both extinguishment splash tests (no burning grease ejected from appliance during extinguishment) and cooking temperature splash tests (no grease droplets larger than 3/16 inch splashed from the appliance). *Note: Failure of a splash test constitutes failure of the system at that nozzle location, even if fire extinguishment has been achieved.*

8. Existing wet chemical systems remain acceptable as long as the system is:
   A. Installed in its original location.
   B. Protecting original equipment, without any changes to the hazard, the system, or the cooking methods.
   C. In compliance with UL 300 Listing requirements.

   Answer: B, C

UL's requirements provide the basis for acceptable fire protection for commercial cooking hazards. However, it is the Authority Having Jurisdiction (AHJ), not UL, which governs the acceptability of installations. Some manufacturers no longer provide support and will not accept liability for dry chemical or pre-UL 300 systems that continue to remain in place or have been salvaged and re-installed in another location. This action is far beyond the concept of "grandfathering". If there is a question as to the level of support for a particular installation, consult the manufacturer of the system.

9. Under what conditions may installed pre-UL 300 systems be removed and reinstalled at different locations?
   A. When it is a wet agent system.
   B. When it is reinstalled & upgraded to meet the current UL 300 standard and the approved manufacturer's design, installation and maintenance manual.
   C. When acceptable to the authority having jurisdiction.
   D. Under no circumstances.

   Answer: B

10. An existing cylinder assembly installed in a pre-UL 300 system develops a leak. The manufacturer replaces the cylinder assembly under warranty with a cylinder assembly complying with the new UL 300. Upgrading of the system is not required. True or False?

    Answer: False

    UL has stated that anywhere a new UL 300 cylinder assembly bearing the UL mark is used, that system must comply with the referenced installation manual. Replacement cylinder assemblies may be provided without the UL mark on the label; however, this may affect the acceptability of the system to the authority having jurisdiction.

11. There is no way to know whether a cylinder assembly is listed in accordance with UL 300 other than to look at the cylinder assembly manufacturing date. True or False?

    Answer: False

    Cylinder labels reference the manufacturer's installation, operation, maintenance, and recharge manual, thus linking the cylinder assembly and system design to the listing approvals. In some cases, the label may also state **"meets the requirements of Standard UL 300".**

12. When should installed pre-UL 300 systems be replaced or upgraded?
    A. When the protected appliance is a deep fat fryer without dual limit switches.
    B. When appliances are protected with dry chemical systems.
    C. When the AHJ, or the insurance company mandates replacement/upgrade.
    D. When the listed replacement parts and training are no longer provided by the system manufacturer.
    E. Both C & D.

    Answer: E

The need for replacement or upgrading of pre-UL 300 system units may come from the authority having jurisdiction, system manufacturer or the insurance company involved. UL does not require replacement or upgrading of old systems.

13. When upgrading an existing wet chemical system, you should add a label to the cylinder stating that the system is installed in compliance with the appropriate installation manual. True or False?

    Answer: True

    Although there is no UL requirement for the additional label, most manufacturers are making such a label available.

14. There are no UL listed pre-engineered dry chemical systems that comply with the current UL 300. True or False?

    Answer: True

    UL has confirmed that no UL 300 listings currently exist for dry chemical system units intended to protect commercial cooking hazards. Testing by manufacturers has shown that while dry chemical systems can extinguish the UL 300 fire tests, re-flash is likely to occur due to the lack of cooling.

15. When my customer adds a new cooking appliance to an old system, I need to upgrade the entire system using equipment complying with the new UL 300. True or False?

    Answer: True

    The replacement or addition of another cooking appliance to a pre-UL 300 system would require that the entire system be upgraded to the new standard.

16. If a fire occurs in the cooking appliance or hood and duct, which of these provides the best line of defense?
    A. The manual pull.
    B. The fuse link actuated automatic system.
    C. A portable fire extinguisher.

    Answer: A

    The heat responsive link may take one minute or more to react and is intended as an automatic means to actuate the system if human intervention is not possible. The manual pull is the fastest means to react to the fire and should always be used before a portable extinguisher, because actuation of the system also shuts off power or gas to the appliance. Of course, the fire department should also be called, and the building evacuated.

17. If I use 500ºF degree links in every system, I will be safe because the system will actuate eventually. True or False?

    Answer: False

Manufacturers provide recommendations for choosing the proper fuse links. These recommendations should be followed. In general, the most rapid acting link not likely to cause an unwanted discharge should be used.

18. I can feel confident about servicing systems without checking the fuel shut-offs as long as I know that they are in place. True or False?

    Answer: False

    The correct operation of fuel shut-off devices is critical to successful fire suppression of cooking appliance hazards even for UL 300 listed systems.

19. Isn't it unrealistic to consider the system to be the prime means of extinguishment and the hand portable secondary back up when the system discharge will require shutdown and more clean-up?

    Answer: No

    Realistically, the most efficient fire suppression will occur when the manual pull for the system is activated. Actuating the system will turn off the heat sources to the cooking appliances and apply agent efficiently without improper human application techniques. If appliance heat sources are not turned off, multiple extinguishers can be used and re-flash may still occur. Downtime and cleanup may be greater after discharging several extinguishers and then having the system discharge. Certainly any chance of increasing damage by leaving the appliance heat source on while attempting extinguishment with hand portables will also affect downtime.

20. UL listed 4OB:C and 8OB:C extinguishers have been tested, listed, and designed specifically for commercial cooking grease fires. True or False?

    Answer: False

    UL tests for B rated fire extinguishers require the use of heptane as the fuel to assign ratings. No commercial cooking appliances or shortenings are used for testing a fire extinguisher to gain a B rating. A new classification (class K) for fire extinguishers for use in commercial cooking areas is included in NFPA 10. UL has developed fire testing protocol using a commercial cooking appliance and appropriate cooking media. Manufacturers test & list portable extinguishers specifically for this use.

21. Since dry chemical extinguishing systems intended for the protection of restaurant cooking areas are not currently authorized to bear the UL Listing Mark, portable dry chemical fire extinguishers are not to be used as the primary fire extinguisher for protection of commercial cooking grease fires. True or False?

    Answer: True

    NFPA 10, 3.2 states: “Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and saturated fats) shall be listed and labeled for Class K fires. Exception: Extinguishers installed specifically for these hazards prior to June 30, 1998.”

Note: The exception is being proposed for elimination in the next published revision of the NFPA 10 document. Extinguishers bearing a 40B:C rating already placed in the kitchen may be moved away from the immediate area and used as a back up to the K rated fire extinguisher requirement in the event emergency egress is impeded.

22. The UL 300 test specifies the use of gas fryers and vegetable shortening because tests proved that these are the worst case. True or False?

    Answer: True & False

    Due to the high auto ignition temperatures, vegetable shortening was the pre-determined cooking media to be tested. The UL 300 test standard included not only fryers but also ranges, griddles, and woks. Each appliance type represented a unique challenge that individually could be considered worse case dependent on the situation. While fryers do offer the highest amount of fuel loading based on their design, it is important to note that these other appliances required key nozzle placement and, in some cases, entirely new system designs in order to pass the new testing standard.

23. The real world fire hazards accounted for in UL 300 were the newer high efficiency cooking appliances and the use of vegetable shortening rather than animal fat. True or False?

    Answer: True

    The two major changes recently in restaurants include: 1. high energy efficiency cooking appliances to reduce costs, which are better insulated and retain heat that increases the difficulty of extinguishment; and 2. the use of low cholesterol vegetable shortening which has more severe burning characteristics (auto-ignition temperatures of 685ºF or greater).

24. If the protected fryer is electric and/or uses animal fat, it is safe to assume that pre-UL 300 systems will provide acceptable protection. True or False?

    Answer: False

    Since pre -UL 300 fryer fire tests were conducted with “mock” appliances and commercially available fryers (both electric and gas) were not used, there is not data to support this assumption. Therefore, all fryers must have the same protection regardless of fryer heat source or type of shortening used.

25. Older fryers without overheat shut-off devices (high limit switches) are more likely to cause runaway fire than newer fryers with mandatory overheat shut-off devices. True or False?

    Answer: True

26. If I have two 28" by 24" griddles sitting side by side, I can protect them with a UL 300 listed system that has griddle coverage of 28" by 50" with one nozzle. True or False?

    Answer: False

    Part of UL 300 testing requires that each appliance must be covered individually unless a specific listing is in the manufacturer's design, installation, and maintenance manual. In order to obtain a

listing covering multiple appliances with a single nozzle, the manufacturer must specifically test this arrangement under the UL 300 test standard.

27. When I see special fryer listings in some manuals that refer to a specific fryer brand name and model number, can I use this coverage for all fryers and retain the UL 300 listing?

    Answer: No

    This is called an "Appliance Specific" listing and such coverage is only UL listed with the make and model fryer that is referenced in the manual. "Flat Bottom" or "Specialty" fryers often do not meet UL 300 requirements for grease depth, heat-up rate, and/or cool down rate for fryers used in testing. In order to obtain a listing for a "Flat Bottom" or "Specialty" fryer, UL ties the coverage to the specific make and model appliance that was tested. This type of coverage is not to be used on other deep fat fryers.

28. What are some obvious signs for an AHJ or maintenance technician to look for in determining that a system installation is not UL 300 listed?
    A. System cylinders contain dry chemical agent that is identified on the manufacturers label.
    B. System uses a single nozzle to protect multiple appliances.
    C. System has only one agent cylinder.
    D. System was manufactured before November 21, 1994.
    E. System protects a combination griddle/range with one nozzle.

    Answer: A, B, E

    To date, no dry chemical system has been listed under UL 300. Multiple appliances must be treated individually under UL 300 (see question #27). A system could have been installed within UL 300 listings, or could have been altered and upgraded to UL 300 listings. A combination griddle/range must be protected as two separate appliances or specifically listed in the manual under UL 300 testing.

29. Owners should consider replacing a dry chemical system protecting cooking appliances with a UL 300 system. True or False?

    Answer: True

    Owners with an existing dry chemical system should evaluate their particular fire hazard and consult with a fire protection expert and the AHJ to determine whether their system should be replaced.

    The AHJ, not UL, governs the acceptability of installations. However, most AHJs and local codes require systems listed by an independent testing laboratory.

    In a September, 2001 letter to FEMA, UL provides clarification of the requirements to maintain the UL Listing of extinguishing systems in the field that protect restaurant cooking appliances.

    According to UL's letter, an extinguishing system would not be considered Listed by UL unless that system is installed, serviced, and maintained in accordance with NFPA 96, NFPA 17, and NFPA 17A, the instructions on the nameplate, and the manufacturer's manual referenced on the nameplate. When the appropriate service part(s) or agent for recharging are no longer available for a specific model UL Listed extinguishing system unit, the Listing for that system unit cannot be maintained in

accordance with the manufacturer's manual and NFPA Standards and, therefore, would not be considered UL Listed. If this situation exists, then it is recommended that consideration be given to replacing a dry chemical system protecting commercial cooking operations with a UL 300 system. Any system requiring alterations or that has had changes to the appliance(s) (including the addition of high efficiency / quick recovery appliances), should be upgraded to UL 300.

31. UL 300 compliance means:
    A. All pre-engineered restaurant system units, including installed pre-UL 300 systems, must comply with UL 300 after the effective date.
    B. All new pre-engineered restaurant system units must be in compliance with UL 300.
    C. All pre-engineered restaurant system(s) manufactured on or after the effective date must be in compliance with UL 300.

    Answer: C

    UL audits the manufacturing of the product through a follow-up service at the factory.

32. If I install a system manufactured using old nozzle coverage from a manual that was listed under UL Subject 300, is the installation in accordance with the UL listing?

    Answer: No

    Such an installation would not be in accordance with the UL listing since the design, installation, and maintenance manual is part of that listing. AHJs, not UL, govern the acceptability of installations. However, most AHJs and local codes require systems listed by an independent testing laboratory. This installation would not be listed. Furthermore, since the manufacturers' design and installation instructions and requirements are being ignored, all liability for the system's performance will rest with the installing company.

Founded in 1930, the Fire Equipment Manufacturers' Association is an international, non-profit trade association dedicated to manufacturing commercial fire protection equipment to serve as the first line of defense against fire in its early stages.

For more information and a list of current FEMA members, visit the FEMA website at www.femalifesafety.org.

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