

Fire Certification to Standard UL 72 for document protection Class 350

- Who are UL?
- How does UL test?
- How does UL classify?
- How does UL compare to others?

Who are UL?

Underwriters Laboratories Inc, Chicago,
“UL is a global independent safety science company with more than a century of expertise innovating safety solutions from the public adoption of electricity to new breakthroughs in sustainability, renewable energy and nanotechnology. Dedicated to promoting safe living and working environments, UL helps safeguard people, products and places in important ways, facilitating trade and providing peace of mind”

UL standards are recognised globally



Source: <http://ul.com/aboutul/>

Who are UL?

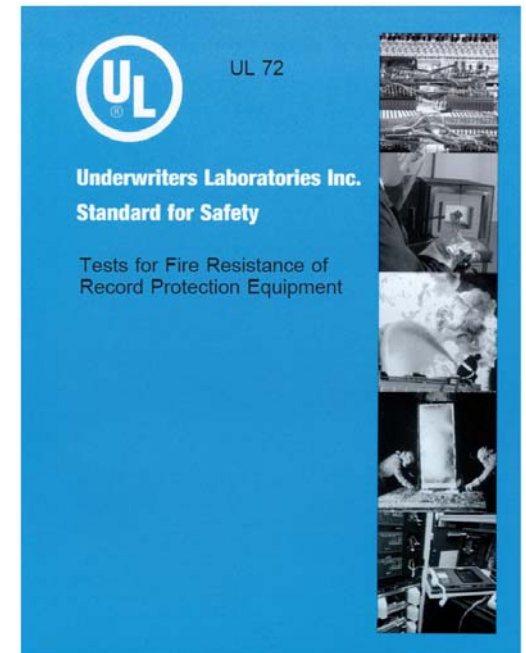
Underwriters Laboratories Inc

Have created and continually update, test criteria concerning industrial, commercial and consumer goods including those for burglary and fire protection products.

Vaults, Safes, Document Cabinets, Data Cabinets and Fire Resisting Files are all covered by UL standards

The standard relating to fire protection safes, cabinets and files is known as:

Standard UL 72

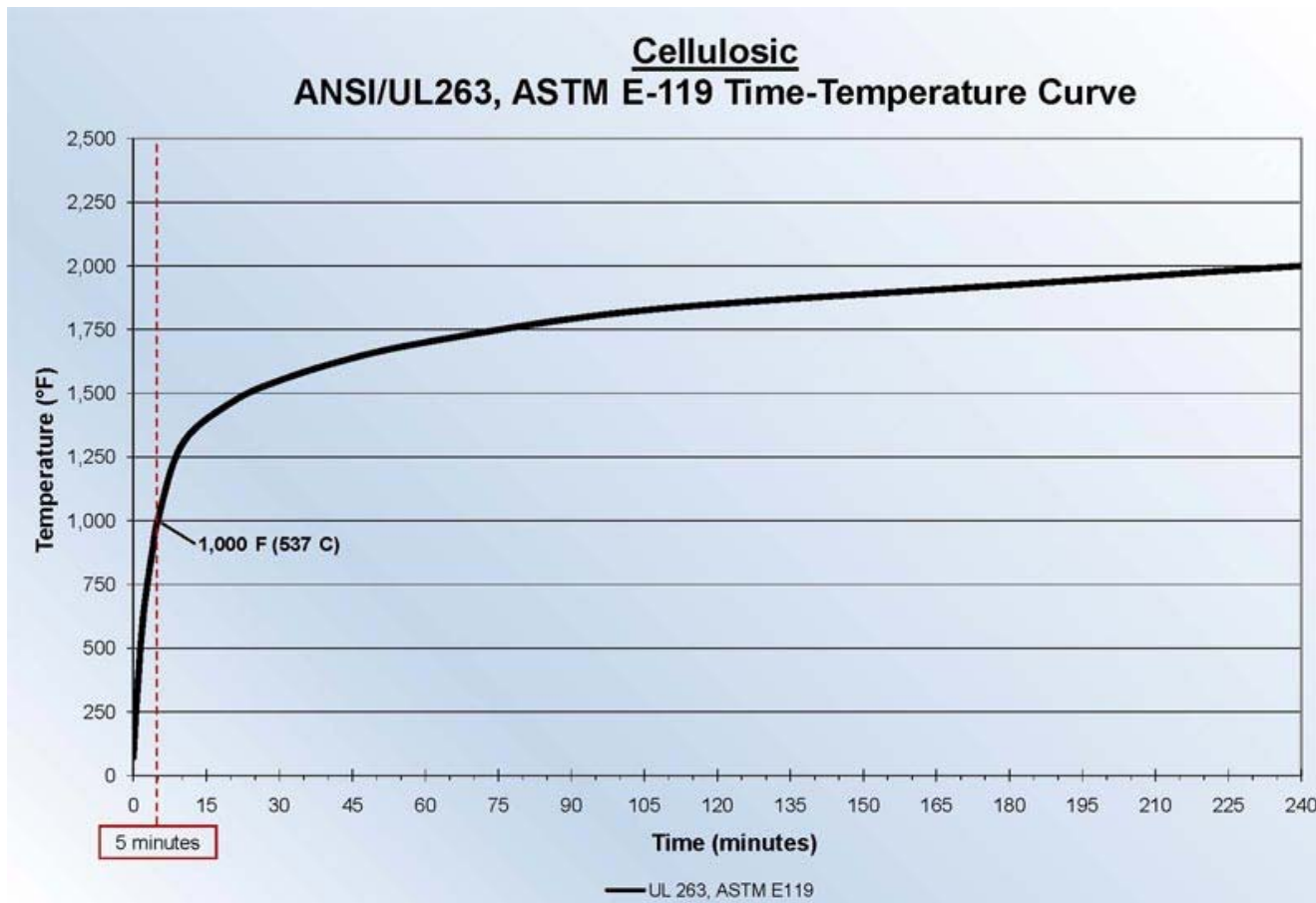


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How does UL test?

In common with many other testing and certification bodies around the world, UL furnaces heats products in a controlled environment.

The furnace temperature is governed according to ISO 834 which is the temperature/time conditions which must be adhered to.



Other standards using these conditions include EN 1047-1, EN 1047-2, EN 15659, NT 017, etc etc.

The use of these furnace conditions is therefore by no means unique.

The furnace is used to conduct three basic tests:

- **Fire Endurance Test**

How the unit performs when heated



- **Fire and Impact Test**

How the unit performs if during a fire it crashes through to the floor below



- **Explosion Hazard Test**

How the unit reacts to a sudden exposure to high temperatures



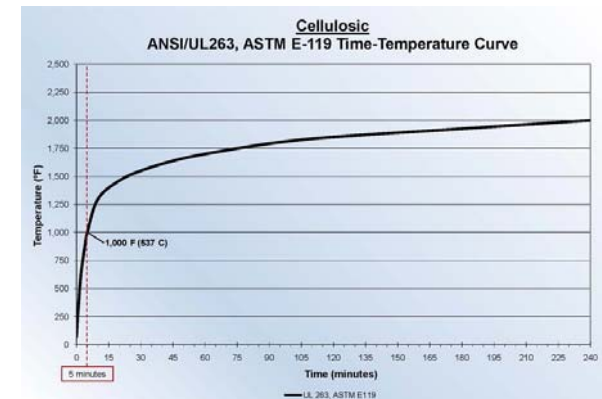
It is possible to combine the Fire and Impact Test with the Explosion Hazard Test when having products fully tested

Fire Endurance Test

1. Depending upon the type of unit being tested, contents are distributed loosely throughout the interior.
2. Internal sensors are positioned on all internal faces, top bottom, sides and rear, one on the door or two if double door. This actually means 6 per drawer in the case of a fire file. Humidity is also measured in the case of data cabinets and containers
3. The unit is placed inside the furnace. At this point the temperature inside the furnace is local ambient temperature.
4. The furnace is switched on and conditions within the furnace closely monitored to ensure compliance with ISO 834
5. After the allotted time, 30 minutes, 60 minutes, 120 minutes etc the furnace is turned off
6. Internal temperatures are measured until a significant decrease is noted. This could be as long as 72 hours.



For the maximum permissible internal temperatures, humidity levels and timings please refer to the later section "How does UL Classify?"



Fire and Impact Test

1. A design will not be considered for Fire & impact testing unless it has first passed the Fire Endurance test.
2. A unit is prepared in the same way as for Fire Endurance testing, however the sensors used are usually temperature indicator strips not wired sensors to allow the unit to be dropped
3. The unit is placed into the furnace at ambient temperature.
4. The furnace is switched on and conditions within the furnace closely monitored to ensure compliance with ISO 834
5. After the unit has been exposed to furnace heating for the allotted time it is immediately removed from the furnace
6. Within 2 minutes the unit is hoisted 9.81m/30 feet into the air and dropped onto a bed of brick rubble set upon a concrete base.
7. The unit is upturned and returned to the furnace.
8. The temperature within the furnace is increased according to the duration of certification required and the unit undergoes a second period of heating.
9. After the set period of time the furnace is turned off and internal temperatures are measured until a significant decrease is noted.



For the maximum permissible internal temperatures, humidity levels and timings please refer to the later section “How does UL Classify?”

The Explosion Test

Not as dramatic as it sounds!!!!

But ALL UL 72 certified units have to pass the Explosion Test whether or not they face up to the Impact test.

It is designed to test the actual construction of the unit and to ensure it is able to stand up to the enormous stresses and strains an object is subject to when suddenly faced with very high temperatures.

It may be performed separately if only Fire Endurance classification is required or combined with the Fire & Impact test if the manufacturer accepts; in this case the test is modified slightly.

1. The unit is prepared as per the Fire Endurance test.
2. The furnace is pre-heated to 2000°F/1090°C
3. Within a 4 minutes period the furnace is opened and the unit (which is at ambient temperature) inserted into the furnace. During this process the temperature of the furnace will fall by several hundred degrees.
4. The temperature of the furnace is brought back up to 2000°F/1090°C and maintained for a predetermined time
5. After the set period of time the furnace is turned off and internal temperatures are measured until a significant decrease is noted.

For the maximum permissible internal temperatures, humidity levels and timings please refer to the later section “How does UL Classify?”



How does UL Classify?

UL uses the test methods outlined previously to assess the performance of cabinets, safes and files.

To pass, they have to achieve the following results under the conditions stated:

For all classifications

Duration	Fire Endurance	Explosion	Fire & Impact	When combined with Explosion
½ hour	30min Max temp 1462°F/795°C	Pre-heated furnace @ 2000°F/1090°C 20min	20min-drop-20 min Max temp 1462°F/795°C	Pre-heated furnace 2000°F/1090°C 20min-drop-then 20 min up to a maximum of 1462°F/795°C
1 hour	1 hour Max temp 1700°F/927°C	Pre-heated furnace @ 2000°F/1090°C 30min	30min-drop-30min Max temp 1550°F/843°C	Pre-heated furnace 2000°F/1090°C 30min-drop-then 30 min up to a maximum of 1550°F/843°C
2 hour	2 hour Max temp 1850°F/1010°C	Pre-heated furnace @ 2000°F/1090°C 30min	45min-drop-45min Max temp 1638°F/892°C	Pre-heated furnace 2000°F/1090°C 30min, reduce temp to 1550°F/843°C and heat for 15min up to a maximum of 1638°F/892°C Drop and then reheat to a maximum of 1638°F/892°C

The difference is the criteria for each class

Class	Maximum internal temperature	Maximum internal humidity
Class 350	No higher than 350°F/177°C at anytime	100%
Class 150	No higher than 150°F/66°C at anytime	No higher than 85% at anytime
Class 125	No higher than 125°F/52°C at anytime	No higher than 80% at anytime

How does UL Classify?

UL classifies uses three criterial levels:

- Class 350 Refers to paper protection
- Class 150 Refers to USB data storage media protection
- Class 125 Refers to magnetic data storage media protection

UL then provides several time durations within each classification:

½ hour, 1 hour, 2 hours etc.

Finally UL refers to the type of test.

Either

- “Fire Endurance” where only the Endurance and Explosion tests have been carried out with a successful outcome

Or

- “Fire and Impact” where all three tests have been carried out and passed

So for example:

Class 350 1hour Fire and Impact

To avoid confusion.

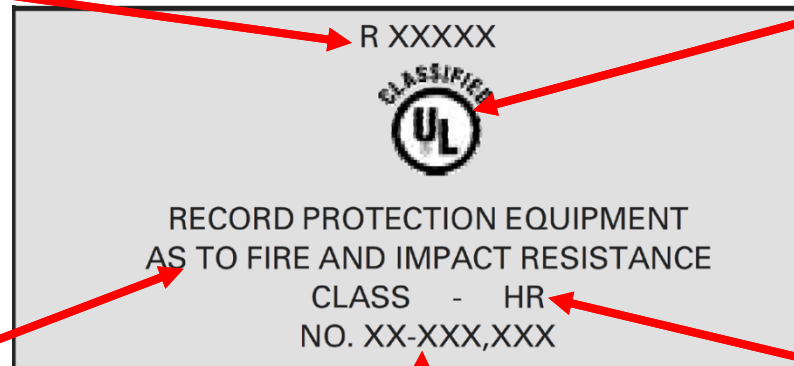
Always read the label or leaflet carefully to fully understand what certification is being claimed

How does UL Classify?

All certified products will carry a label containing information about the certification holder,

File number beginning with "R"
This is the certificate number and is traceable to the manufacturer if not shown on the label

The UL Classified logo used under license as each label is controlled by UL



The type of testing undertaken. In this case both fire endurance and impact test. **NOTE** If it only says "Fire Resistance" then it hasn't undergone impact testing

The classification, 350, 150 or 120 and the duration ½, 1 or 2 hours

Serial number or date of manufacture

How does UL compare to other certification labels?

UL certifications are widely accepted and recognised throughout the world as being of the most stringent and difficult to pass.

Only UL 72 and EN 1047-1 the European norm, incorporate a controlled impact or drop test as part of their testing procedure, so comparing them:



Norm / Standard	UL 72 Fire & Impact	EN 1047-1
National body based	USA	Europe
ISO 834 heating?	Yes	Yes
Fire endurance test?	Yes ¹	Yes
Explosion test?	Yes	Yes
Impact test?	Yes*	Yes
Furnace Cooling?	Yes	Yes
Multiple sensors?	Yes	Yes

¹ UL 72 is the only standard where the unit is turned upside down when it goes back into the furnace for its second heating period. This exposes any damage caused by impact directly to the furnace conditions

How does UL compare to other certification labels?

However, there are several standards and labels used globally which solely focus on fire endurance so to compare some of those:



Norm / Standard	UL 72 Fire Endurance	EN 15659	NT 017	JIS 1037	KSG 4500
National body based	USA	Europe	Sweden	Japan	Korea
ISO 834 heating?	Yes	Yes	Yes	Yes	Yes
Fire endurance test?	Yes	Yes	Yes	Yes	Yes
Explosion test? ¹	Yes	No	No	No	No
Furnace Cooling?	Yes	Yes	No ²	No ³	No ³
Multiple sensors?	Yes	Yes	Yes	No	No

¹ Only UL 72 incorporates the Explosion test as part of Fire Endurance certification to ensure designs are robust and can handle the internal stresses that sudden, rapid heating produces.

² The Swedish NT test simply stops the test at the end of the furnace heating period and wait until it can be removed. No conditions are monitored.

³ In both the Japanese and Korean tests after completion of the defined heating period the units are hosed down to allow removal from the furnace.

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