



Application Guide

FLAME RETARDANT CABLES

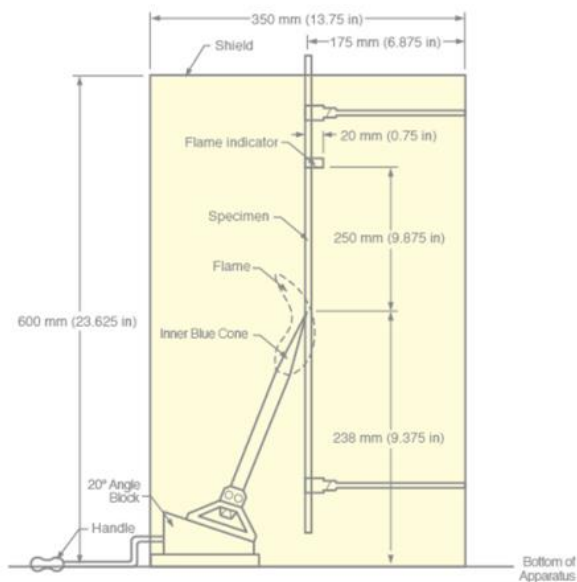
Why the cable need flame retardant?

With long-term use wires and cables, short circuits or fire may occur, which can make the cable combustible, causing fuel fire or damage to equipment. Thus it is necessary for cables to have properties which ensure that it will not spread flames or become flammable over a period of time. This is called the incombustibility of the cable, also known as being flame retardant. If a cable lacks flame retardant properties, fire can cause serious consequences. Akatsuki undertake a proprietary flame test lab, including two different standards UL 1581 and IEC60332. If you want to know more information about this test, please download the full introduction.

The purpose of the fire test of cable is to examine the cables' ability to stop the spread of the flames and to test the flame retardant properties of the cable. This test is necessary and very important. The cable industry uses a wide range of fire tests; UL1581 VW - 1, IEC 60332 flame retardant and smoke density test.

- UL 1581 VW-1 flame test procedures

This tests five iterations of fire exposure, 15 seconds at a time, with a fire interval of 15 seconds. After the test, the flame burns less than 60 seconds, indicating flag burning of not more than 25%, and tests that a pad on the bottom of the cotton is not flame affected, to determine that the sample has qualified. If one out of three fails, then it is adjudged as unqualified.



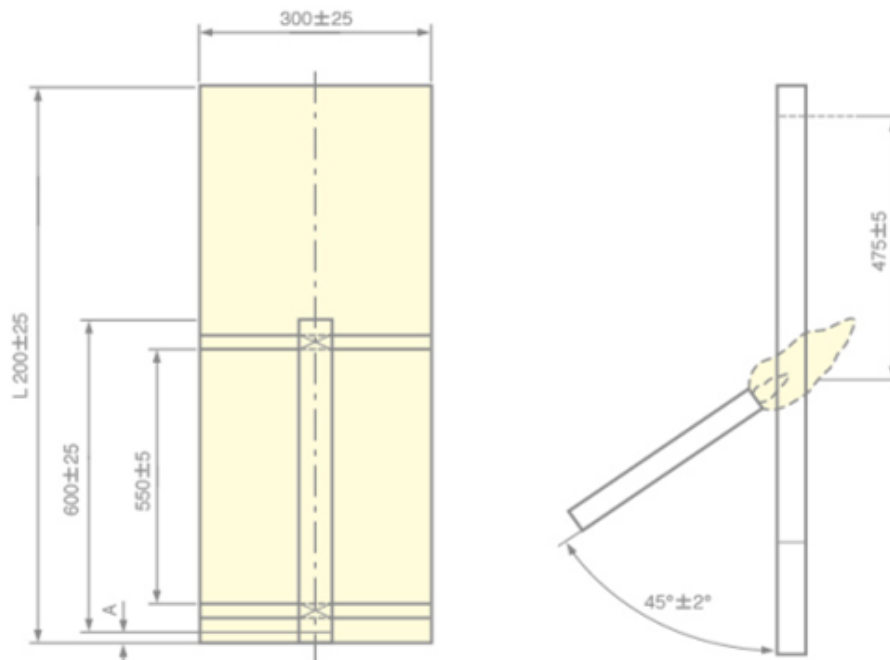
Test Procedure

VW (VW-1,Optional) Determine and Test Procedure

- a) The 5th burning time $\leq 60s$;
- b) Burning area of the flag $\leq 25\%$;
- c) The end of cotton is lighted

- IEC 60332 flame test procedures

According to the cable diameter for fire time setting, see the table below. If on the edge of stent and carbonized part of the distance between the starting point for more than 50 mm, considered unqualified, less than the unqualified; If the burning down to the edge of stent on distance is greater than 540 mm, is also judged not qualified.



Overall diameter of test piece ^a	Time for flame application ^b
mm	s
$D \leq 25$	60 ± 2
$25 < D \leq 50$	120 ± 2
$50 < D \leq 75$	240 ± 2
$D > 75$	480 ± 2

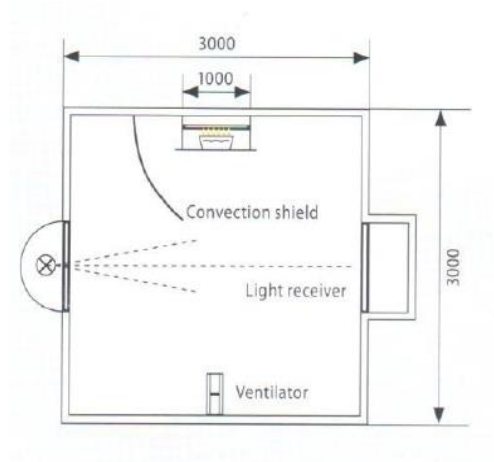
Cable diameter with time relationship for the fire

- Smoke density test procedures

The determination of smoke density is another important aspect to evaluate cable combustion characteristic because it concerns the personnel evacuation and if can put out the fire in a short range. According to the fire department statistics, about 80% of the deaths are caused by the harmful poisoning gas in the fire, the diffuse smoke choking or make the path invisible so that can't escape and then by burned.

So the concept of smoke density is examining the cable from burning under certain conditions when measured the minimum light transmittance. The standard of smoke density test is IEC61034.

Test in the airtight chamber, the combustion chamber size for: 3 mx3mx3m = 27 m³, after waiting for flame test indoor light transmittance.



For low smoke zero halogen cables, cable Standards in general have the requirement of light transmittance that the ability to light reached 60%, the value set basis is to ensure that people can find their way in the smoke. Qualified low smoke zero halogen material and cable design can meet this requirement, however PVC base material of the cable is difficult to achieve this index, so if the projects require for cable light transmittance are not recommended to use the PVC cable.