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(54) **IMPROVED FIRE BARRIER**

FEUERSCHUTZELEMENT

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(56) References cited:
EP-A- 0 390 999 **DE-A- 3 313 526**
DE-A- 4 036 735 **FR-A- 2 135 310**
LU-A- 68 886

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Description

This invention relates to fire barriers. In particular it is concerned with a fire barrier which is especially, but not exclusively, suitable for use in the area above a suspended ceiling.

It will be appreciated that in many buildings, there are large empty roof spaces and similar open spaces above ceilings and suspended ceilings. These open spaces can in the event of a fire provide an easy pathway for the extremely rapid passage of flames and/or combustion products. This is very true where there are also roof ventilators which may help to turn an open space into a chimney.

The potential problem created by largely empty spaces above ceilings has been recognised for many years. It is normal practice to try to break up the roof space with partitions, in an attempt to ensure that any fire can only spread slowly, or relatively slowly, giving time for the emergency services to evacuate the building and attempt to localise the fire.

Known partition materials include fire resistant fabric curtains, typically made of asbestos cloth. The use of such cloth is particularly convenient, since it can be readily folded around cables, pipes and other obstructions. However, more recent partition materials include rigid building boards such as plasterboard though these require considerably more effort to install. More recently, it has been recognised that integrity alone is not enough. Fire can be propagated by ignition of combustible material in contact with the "cold" faces of such barriers and 15 minutes insulation (by which is meant that the temperature of the "cold" face shall not rise more than 140°C above ambient whilst the "hot" face follows the cellulosic curve of BS 476 Part 20) is now required by the Building Regulations (1991), for any cavity barrier greater than 1m by 1m in size. Attempts to replace asbestos cloth and rigid partitions with glass fibre fabrics have met with limited success, the problem being that although structural integrity under fire conditions can be fairly easily attained, two-hour integrity alone is not enough for the reason just given. More significant from a safety standpoint is the rate of temperature rise on the opposite face to that to which the fire is applied. A common test requirement is that the temperature shall remain low enough to prevent ignition of cellulosic material in contact with the opposite face, for at least 30 minutes whilst the other face may reach on the order of 850°C. This is an extremely severe test and a measure of the problem is given by the fact that temperatures in excess of 140°C can easily be reached within only minutes of exposure of the other side of the barrier to fire conditions.

According to the present invention a flexible fire barrier comprises at least two non-asbestos heat-resistant fabric layers spaced apart to define an air gap therebetween, at least one surface of each fabric being coated with a reflective metal layer.

Where three or more fabric layers are employed, the intermediate layer or layers are preferably coated on both faces with a reflective metal layer. Particularly preferred heat-resistant fabrics include fabrics made from mineral fibres, especially glass fibre fabrics. The reflective metal layer is preferably an aluminium foil loosely attached to the fabric with or without the aid of an adhesive. The reflective metal layer may also be applied by a vacuum/vapour deposition process although discontinuous bonding is preferred. Advantageously, the fabric has a textured surface, being made from textured yarns or subsequently treated by a brushing/raising process. The fabric is preferably treated to enhance its resistance to heat/flame.

An air gap as small as a few millimetres has been found effective, although wider gaps on the order of 20-100mm or more are preferred as being easier to produce.

Surprisingly, it has been found that the simple construction of this invention is capable of surviving a relatively severe fire test such as the one described earlier. As a demonstration of this, a fire barrier was made from two glass fibre fabrics spaced apart 30mm. The inner or confronting fabric surfaces were loosely coated with an aluminium foil. When subjected to a full scale fire test, the face opposite the one to which the fire was actually applied exhibited a temperature rise of only 88°C after thirty minutes. By comparison with this, a single layer of the same fabric with the same aluminium foil applied to both faces survived only two minutes before the temperature on the non-exposed side exceeded 140°C.

It is preferred that the construction is symmetrical, to ensure that the fire performance is as far as possible the same from both sides of the partition.

In a preferred construction, confronting fabric surfaces are coated with a reflective metal layer.

In addition to the preferred glass fibre fabrics, it may also be possible to use specialised organic material such as, for example, partially carbonised acrylic fibres. However, such materials are relatively expensive and for that reason, glass fibre fabric, particularly when treated with proprietary high temperature fabric dressings, will be preferred for most applications. However, it is also possible that satisfactory results may be obtained by using as the fabric component, a high temperature paper material. Fabric in this present context thus includes papers and boards.

Whilst it is preferable that the aluminium foil be bonded to the fabric, the actual strength of the bond may not be critical since in use, the fixing system for the fire barrier will also help to support the metal foil. The foil should, however, be strong enough to withstand disruption of the adhesive system, at least for sufficiently long to pass the fire test. A certain amount of experimentation may be necessary in order to determine the appropriate type of metal foil to use with a particular fabric.

The preferred discontinuous bonding of the foil to the fabric can be achieved in several ways. For exam-

ple, adhesive can be printed onto the foil and/or fabric as a pattern of isolated dots. Hot melt adhesive is also available in a mesh form.

The purpose of discontinuous bonding is to reduce transmission of heat, whilst at the same time optimising reflection of heat.

In order that the invention be better understood, a preferred embodiment of it will now be described with reference to an as illustrated by the accompanying drawings in which

Figure 1 is a perspective view partly in section, of a fire barrier in accordance with the invention,

Figure 2 is a diagrammatic illustration of how a metal foil and a fabric may be bonded together for the purposes of Figure 1, and

Figure 3 is a diagrammatic illustration of another way in which a metal foil and a fabric may be bonded together for the purposes of Figure 1.

In the interests of clarity, like parts in all three figures bear like reference numerals.

Referring firstly to Figure 1, a fire barrier in accordance with the present invention comprises a pair of generally vertically disposed side frames in the form of metal channel members 2, 3. It will be appreciated that these side frames are selected to suit a particular end use; they will be configured to fit into a specific roof space area as regards their height and lateral separation. The channels support two composite fabric layers 4, 5 which are spaced apart by the width of the channels. Each composite fabric is made up of a textile fabric layer 6 and an aluminium foil layer 7, the two layers being relatively loosely bonded together, as for example by the methods illustrated in Figure 2 and Figure 3. It will be appreciated that relatively loose bonding can also be achieved in other ways. In particular, the layers may be bonded together only in the vicinity of their attachment to the supporting channel members 2, 3. This is illustrated in Figure 1, where the layers are shown attached to the channel members only by clips, 9, 10, 11 and 12 respectively.

Referring now to Figures 2 and 3, a roll of composite fabric layer comprises a textile fabric layer and an aluminium foil layer 7, the latter being pre-treated with an adhesive applied selectively as a pattern of dots 15 (Figure 2) or as a mesh 16 (Figure 3).

A preferred textile fabric layer 6 is as woven glass fibre fabric, especially one treated with a heat resistant coating such as WELDSTOP (Registered trade mark) which enhances integrity under severe heat conditions.

A barrier constructed in accordance with Figure 1 and based on glass fibre fabric of the kind just mentioned was fire tested as described earlier. It survived much longer than the 15 minutes called for in the current Building Regulations.

Claims

1. A flexible fire barrier comprising at least two non-asbestos heat resistant fabric layers (6) spaced apart to define an air gap therebetween, at least one surface of each fabric being coated with a reflective metal layer (7).
2. A flexible fire barrier according to claim 1 wherein the fabric is wholly or predominantly of mineral fibres.
3. A flexible fire barrier according to claim 1 wherein the fabric is a high temperature resistant paper or board.
4. A flexible fire barrier according to any preceding claim wherein the disposition of the constituent parts is symmetrical so as to ensure that the fire performance is as far as possible the same from both sides of the partition.
5. A flexible fire barrier according to any preceding claim wherein confronting fabric surfaces are coated with a reflective metal layer (7).
6. A flexible fire barrier according to any preceding claim wherein the reflective metal layer (7) is an aluminium foil.
7. A flexible fire barrier according to claim 6 wherein the aluminium foil is a discrete layer which is bonded to the fabric with an adhesive.
8. A flexible fire barrier according to claim 5 wherein the aluminium foil is produced in situ by metallising or vapour deposition.
9. A flexible fire barrier according to any previous claim wherein the reflective metal layer is discontinuously bonded to the fabric surface.
10. A flexible fire barrier according to any preceding claim having three spaced-apart fabric layers, the intermediate ones of which has a reflective metal layer on each face thereof.
11. A flexible fire barrier according to any preceding claim where in the air gap is in the range from about 10mm to 100mm.
12. A flexible fire barrier according to claim 8 wherein the air gap is in the range 20mm to 50mm.

Patentansprüche

1. Biegsame Feuerschutzwand, umfassend minde-

stens zwei hitzebeständige, keinen Asbest enthaltende Textilschichten (6), so beabstandet voneinander, daß sie einen Luftspalt dazwischen festlegen, wobei mindestens eine Oberfläche von jedem Textil mit einer reflektierenden Metallschicht (7) beschichtet ist.

2. Biegsame Feuerschutzwand nach Anspruch 1, wobei das Textil vollständig oder vorwiegend aus Mineralfasern besteht.

3. Biegsame Feuerschutzwand nach Anspruch 1, wobei das Textil ein hochtemperaturbeständiges Papier oder ein hochtemperaturbeständiger Karton ist.

4. Biegsame Feuerschutzwand nach einem vorangehenden Anspruch, wobei die Anordnung der Bestandteile symmetrisch ist, damit gewährleistet ist, daß die Eigenschaften beim Brand so weit wie möglich von beiden Seiten der Abtrennung dieselben sind.

5. Biegsame Feuerschutzwand nach einem vorangehenden Anspruch, wobei die gegenüberliegenden Textilflächen mit einer reflektierenden Metallschicht (7) beschichtet sind.

6. Biegsame Feuerschutzwand nach einem vorangehenden Anspruch, wobei die reflektierende Metallschicht (7) eine Aluminiumfolie ist.

7. Biegsame Feuerschutzwand nach Anspruch 6, wobei die Aluminiumfolie eine einzelne Schicht ist, die mit einem Klebemittel an dem Textil befestigt ist.

8. Biegsame Feuerschutzwand nach Anspruch 5, wobei die Aluminiumfolie durch Metallisieren oder Dampfabcheidung hergestellt wird.

9. Biegsame Feuerschutzwand nach einem vorangehenden Anspruch, wobei die reflektierende Metallschicht diskontinuierlich an der Textiloberfläche befestigt ist.

10. Biegsame Feuerschutzwand nach einem vorangehenden Anspruch mit drei voneinander beabstandeten Textilschichten, wobei die mittlere an jeder Seite eine reflektierende Metallschicht aufweist.

11. Biegsame Feuerschutzwand nach einem vorangehenden Anspruch, wobei der Luftspalt im Bereich von etwa 10 mm bis 100 mm liegt.

12. Biegsame Feuerschutzwand nach Anspruch 8, wobei der Luftspalt im Bereich 20 mm bis 50 mm liegt.

Revendications

1. Coupe-feu flexible comprenant au moins deux couches de tissu thermorésistants (6), non constituées d'amiante, espacées l'une de l'autre pour définir un intervalle d'air entre elles, au moins une surface de chaque tissu étant revêtue d'une couche de métal réfléchissant (7).

2. Coupe-feu flexible selon la revendication 1, dans lequel le tissu est constitué totalement ou principalement de fibres minérales.

3. Coupe-feu flexible selon la revendication 1, dans lequel le tissu est un papier ou un carton résistant aux températures élevées.

4. Coupe-feu flexible selon l'une quelconque des revendications précédentes, dans lequel la disposition des parties constitutives est symétrique de manière à assurer que la tenue au feu soit autant que possible la même des deux côtés de la cloison.

5. Coupe-feu flexible selon l'une quelconque des revendications précédentes, dans lequel les surfaces des tissus en regard sont revêtues d'une couche de métal réfléchissant (7).

6. Coupe-feu flexible selon l'une quelconque des revendications précédentes, dans lequel la couche de métal réfléchissant (7) est une feuille mince d'aluminium.

7. Coupe-feu flexible selon la revendication 6, dans lequel la feuille mince d'aluminium est une couche discrète qui est liée au tissu par un adhésif.

8. Coupe-feu flexible selon la revendication 5, dans lequel la couche mince d'aluminium est produite in situ par métallisation ou dépôt en phase vapeur.

9. Coupe-feu flexible selon l'une quelconque des revendications précédentes, dans lequel la couche de métal réfléchissant est liée de manière discontinue à la surface du tissu.

10. Coupe-feu flexible selon l'une quelconque des revendications précédentes, comportant trois couches de tissu espacées l'une de l'autre, dont la couche intermédiaire a une couche de métal réfléchissant sur chacune de ses faces.

11. Coupe-feu flexible selon l'une quelconque des revendications précédentes, dans lequel l'intervalle d'air se situe dans la plage d'environ 10 mm à 100 mm.

12. Coupe-feu flexible selon la revendication 8, dans le-

quel l'intervalle d'air se situe dans la plage de 20 mm à 50 mm.

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