

## **US20170284014 - Flame retardant composition, flame retardant fiber and fabric formed using the same, and method for their production**

*SUPREME*

Published 2017-10-05

A flame retardant composition containing a phosphorous containing ammonium salt, a crosslinker, and water is provided, and its application to yarn or fabric to provide a flame retardant yarn or fabric.

In a preferred embodiment, the yarn or fabric is made from a polyurethane elastomer, such as a spandex.

A method to prepare the flame retardant composition and apply it to the fiber or yarn is also provided.

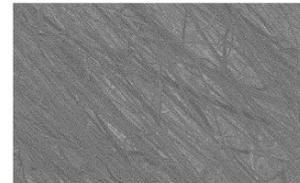
## **US20170281992 - Flame and particulate resistant knit article**

*DU PONT DE NEMOURS*

Published 2017-10-05

An article of protective clothing comprising a durable multilayer fabric laminate formed from

i) a first flame resistant knitted fabric made from yarns, the fabric having an average fabric modulus of 8 grams-force or greater;



ii) a flame-resistant nonwoven fabric having a machine direction and a cross direction, and consisting of a plurality of continuous filaments having a diameter of less than 1000 nm, the filaments in the fabric being substantially oriented parallel with the machine direction and having stretch and recovery in the cross direction; and

iii) a second flame resistant knitted fabric made from yarns, the fabric having an average fabric modulus of 8 grams-force or greater;

wherein the nonwoven fabric is positioned between and coextensive with the first and second flame-resistant knitted fabrics; the nonwoven fabric being attached to the first knitted fabric by a set of first attachment points, the attachment points defining a first unattached area having a first effective diameter; the nonwoven fabric also being attached to the second knitted fabric by a set of second attachment points, the attachment points defining a second unattached area having a second effective diameter; wherein both the first unattached area and the second unattached area each have a value A, in square centimeters, according to the formula :

$$C < A \leq (14 * B) + 100,$$

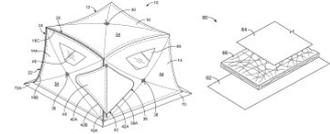
the value B being the sum of the average fabric modulus of the first knitted fabric and the average fabric modulus of the second knitted fabric, in grams-force; and the value C being 5 square centimeters.

## **US9777507 - Flame resistant insulated fabric for shelters**

*CLAM*

Published 2017-10-03

A shelter including an enclosure having a plurality of interconnected side walls defining a floor space and being connected to a top wall, with at least one of the side walls or the top wall including a panel construction comprising a flame resistant insulated fabric, the flame resistant insulated fabric including a flame resistant outer layer, a flame resistant inner layer, an insulating middle layer disposed between and adhesively bonded to the flame resistant outer layer and the flame resistant inner layer.



Also disclosed is a method of making a shelter including forming the flame resistant insulated fabric.

## **DE202017003447 - Textile multi-layer non-combustible, textile fiber designs in combination with intumescent mixtures of substances for the production of a heat - and flame protection barrier**

*CASARETTO RAINER*

Published 2017-09-07

Textile laminate structures made of non-combustible, Textile fiber structures such as woven, knitted and nonwoven fabrics are, characteristic in, that between the fabric layers a mixture intumescent materials if, - and flames extremely high heat which a heat-insulating layer between the fabric layers and thus forms an effective barrier to body preferably produces.

The fabric layers are preferably of glass fiber, basalt fiber and comparable refractory fibers and mixtures thereof (softening point  $> 800\text{ }^{\circ}\text{C}$ ), the temperatures of a conventional fire resistant.

## **WO2016189396 - Fire extinguishing impregnation agent and its use in absorbent textiles and fire protection suit resistant to direct flame and fire protection evacuation device for use in direct flame**

*DYTRT PAVEL*

Published 2017-08-31

The aim of the invention is to provide a nonflammable and heat radiation resistant agent, which is applicable on a protective suit.

The fire protection suit resistant to direct flame is made of any textile, which can be equipped with a thermal barrier (i.e. aluminum foil) on one side.

The textile without thermal barrier impregnated by fire extinguishing impregnation agent containing

higher concentration of titanium dioxide can substantially prolong the durability of the suit in the threatened area.

Fire extinguishing impregnation agent contains 1 - 99.9 parts per weight of fire extinguishing agent, 1 - 99 part per weight of water, titanium white or other substance reflecting the heat radiation and alternatively also an antifreeze component.

The fire extinguishing impregnation agent is applied on suits or blankets made of thickened cotton fabric by soaking the fabric into the fire extinguishing impregnation agent.

**WO2017129783 - Textiles having flame protection function**

*SCHOELLER TEXTIL*

Published 2017-08-03

The invention relates to flame protection foam coatings for textile planar products, wherein the coatings comprise reduced-salt-content expanded graphite in the form of platelets, having a particle distribution having a fraction of > 80 weight percent having a diameter of at least 0.2 mm and/or a minimum fraction of 70% having a mesh width of > 50 mesh (0.3 mm), at least one binder, and at least one foam stabilizer.

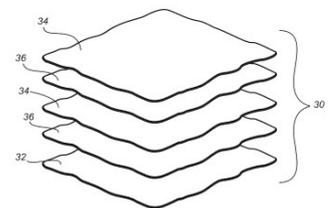
The invention further relates to methods for the production thereof, to the use thereof to produce textile planar products, and to textile planar products having such flame protection foam coatings.

**US2017203540 - Improved flame resistant thermal liners and garments made with same**

*SOUTHERN MILLS*

Published 2017-07-20

Embodiments of the present invention replace relatively bulky nonwoven thermal insulating materials used in thermal liners with thin, lightweight, flexible films that maintain or improve TPP performance while reducing the thickness, and enhancing the flexibility, of the thermal liner so as to increase wearer comfort.



Moreover, the films incorporated into the thermal liners can be both air and vapor permeable such that the TPP performance is not realized at the expense of THL performance.

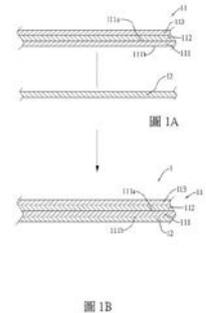
Rather, the THL performance of garments incorporating embodiments of thermal liners contemplated herein is comparable to—if not improved over—garments formed with traditional thermal liners.

## TWM545047 - Bed package that fire protection waterproofing compound cloth and makes

HAPPY INDUSTRIAL

Published 2017-07-11

Fire protection waterproofing compound cloth of this creation contains the load bearing level, the flame-resistant cotton level and superficial cotton level and aquiclude, the load bearing level contains the first side and to the first side second side, the flame-resistant cotton stack-up supposes on the first side, the superficial cotton stack-up supposes on the flame-resistant cotton level, aquiclude cover on the second side.



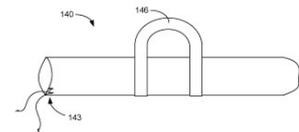
By was stated the bed package that fire protection waterproofing compound cloth made to result to have the fire protection and waterproof nature, can thus cut the probability that the mattress putrefied and catches fire, not can only guarantee that user's health and security, moved about with difficulty particularly either not independent ability newborn, patient or senior citizen's health and security.

## US2017160052 - Fire-resistant gun sock

BROWN CURTIS M (Inventor)

Published 2017-06-08

Described is an apparatus for containing firearms or other sporting equipment.



The apparatus may be a flexible sleeve comprised of fire-resistant material.

The apparatus may have a closure at a first end of the sleeve and a closed second end of the sleeve.

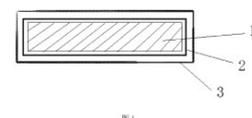
The flexible sleeve may also be comprised of additional layers of protective material, such as thermal insulation and water-wicking fabrics.

## WO2017091976 - Expansion flame retardant system for mattress or pillow inner-sleeve filler flame retardation and method therefor

CHEN JIE (Inventor)

Published 2017-06-08

Disclosed is an expansion flame retardant system for mattress or pillow inner-sleeve filler flame retardation and a method therefor.



Yarns or cloth with cellulosic fibres or cellulosic fibres blended with

chemical fibres as a raw material are processed and treated using an inorganic flame retardant containing nitrogen and phosphorus, so that the yarns or the cloth and the inorganic flame retardant containing nitrogen and the phosphorus constitute the expansion flame retardant system; by using a covering expansion function achieved when the inorganic flame retardant containing nitrogen and phosphorus is heated, the yarns or the cloth have a flame retardancy; the yarns or the cloth are made into an inner sleeve of a mattress or a pillow, and the inner sleeve wraps a filler, so that in case of open fire on the mattress or the pillow, flames cannot pass through the inner sleeve to ignite the filler, and the flame retardation of the mattress or the pillow is realized, which passes the America 16CFR1633 mattress flame retarding standard test.

The price of the flame retardant mattress inner sleeve treated by the method of the present invention is lowered by half in comparison with a mattress inner sleeve formed by weaving glass fibre flame retardant core-spun yarns.

In addition, the former is degradable in the natural environment after being discarded, while the glass fibre contained in the latter cannot be naturally degraded, which may pollute the environment; besides, smoke resulting from the former is obviously less than that generated resulting from the latter in outbreak of fire.

## **EP3173390 - Flat textile substrate with at least partial fire protection coating, method for its production and uses thereof**

*VITRULAN TEXTILE GLASS*

Published 2017-05-31

A laminar Textile-UBS-stepped with a at least range-wise flame protection coating and a Procedure to its Production are made available According To Invention.

The Coating of the laminar Textile Substrate contains first of all an inorganic Flame Protection Means on Magnesium Basis, Aluminum Basis and/or Ammonium Basis and secondly a Flame Protection Means on Phosphorus Basis or phosphorus nitrogen basis.

Furthermore the Coating contains a strengthen-based Bonding Agent.

It was found surprising that the according to invention, laminar Textile-UBS-stepped into the Fire Class A2 according to DIN EN 13501-1:2010-01 to be classified can.

Based on the excellent Fire Protection Characteristics among other things the Use of the laminar Textile Substrate is suggested as Wallpaper.

## **RU171333 - Fire-- heat-resistant material for the protective clothing**

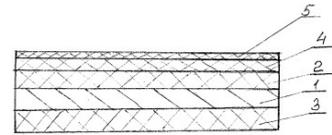
*Смирнова Елена Леонидовна (RU);*

*Лукашевский Алексей Викторович (RU);*

*Шемаков Андрей Викторович (RU)*

Published 2017-05-29

Utility model relates to the field of the production of multilayer fire-- heat-resistant materials and can be used in production special protective clothing of fireman, requiring increased resistance to thermal effect with the conducting emergency rescue works in immediate proximity to the open flame, and also from the unfavorable climatic actions.



The creation of the fire-- heat-resistant material for the protective clothing, which possesses high heatproof properties, is The Technical result of utility model.

Technical result is reached in the declared fire-- heat-resistant material for the protective clothing, which contains fibrous layer (1), layers (2), (3) from the filled fluorine-containing elastomer, executed along both sides of fibrous layer (1), and the heat-reflecting layer (4), that contacts by its internal surface with one of the layers (2) or (3) from the filled fluorine-containing elastomer, in this case on the external surface of the heat-reflecting layer (4) is substituted the additional heat-reflecting coating (5), moreover the heat-reflecting layer (4) and the additional heat-reflecting coating (5) they are executed on the basis of the solutions of the filled fluorine-containing elastomer and powder heat-reflecting metal with the mass-ratio of the filled fluorine-containing elastomer and powder heat-reflecting metal in the heat-reflecting layer (4) 15:1, and in the additional heat-reflecting coating (5) - 3:1 and with the mass-ratio of the powder heat-reflecting metal in the additional heat-reflecting coating (5) and the heat-reflecting layer (4) 5:1.

In this fire-- heat-resistant material for the protective clothing preferably:

- fibrous layer (1) is made on the basis of cloth from glass filaments;
- fibrous layer (1) is made on the basis of cloth from siliceous threads;
- as the powder heat-reflecting metal is used aluminum.

## **WO2017084061 - Fireproof and inflaming retarding blended fabric**

*FENG LIRONG (Inventor)*

Published 2017-05-26

A fireproof and inflaming retarding blended fabric, mainly comprising components of cotton fibers, corduroys, spandex filaments, elastic fibers, soybean fibers, plush, and camel hair cloth. According to mass percentages, the fireproof and inflaming retarding blended fabric comprises 35-55 parts of cotton fibers, 25-40 parts of corduroys, 20-30 parts of spandex filaments, 15-22 parts of elastic fibers, 12-25 parts of soybean fibers, 8-15 parts of plush, and 10-15 parts of camel hair cloth; the fabric woven by the components is coated with a fireproof and inflaming retarding agent.

The blended fabric has the advantages that: the fabric made by the preparation has fine and smooth textures as well as soft hand feeling, and is comfortable, warm-keeping, air and moisture permeable, bacteria resistant and bacteriostatic. The fabric does not have problems of shedding, pilling, and fading, has a good water absorption capability which is three times greater than that of all-cotton products, and does not have any skin stimulus. More importantly, the fabric has a fireproof and inflaming retarding function capable of reducing loss when it is on fire.

## WO2017081672 - Fire resistant composite mat

*BASF*

Published 2017-05-18

Disclosed herein are flame resistant composite mats.

The composite mat contains a fiber, fire resistant additive, and a binder.

The mats are useful in the production of flame resistant sandwich constructions.

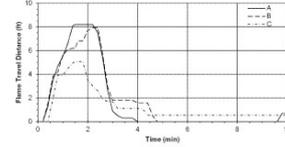


FIGURE 1

## IN4294/MUM/2015 - Method for manufacturing flame retardant fabric and flame retardant fabric thereof

*BOMBAY TEXTILE RESEARCH ASSOCIATION*

Published 2017-05-12

A method for manufacturing a flame retardant fabric, comprising: padding a fabric with acrylate monomers comprising phosphorus; and plasma curing the padded fabric.

The acrylate monomer comprising phosphorus is Bis[-2(methacryloyloxy)ethyl] phosphate.

The method further comprises plasma treating the fabric prior to padding a fabric with acrylate monomers comprising phosphorus.

## US2017130395 - Flame resistant and chemical protective textile material

*MILLIKEN*

Published 2017-05-11

A treated textile material comprises a textile substrate and a finish on the yarns making up the textile substrate. The yarns of the textile substrate comprise inherent flame resistant fibers. The finish comprises a fluorochemical repellent. The treated textile material exhibits improved resistance to chemical splashes and spills, such as those encountered in institutional and commercial laboratory settings.

## EP3165258 - Flame-resistant protective clothing

*SIOEN*

Published 2017-05-10

The flame-resistant protective clothing contains, in the direction from the outside to the inside of the clothing, a flame-resistant, abrasion-resistant outer layer (1), a breathable, water impermeable film (2) and a flame-resistant thermal barrier (3).

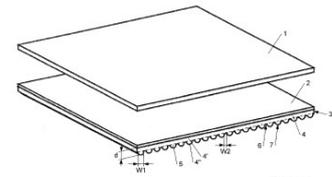


Fig. 1

The flame-resistant thermal barrier (3) contains a fabric (4) which is locally doubled to form air pockets (5) between two fabric parts (4', 4'').

The fabric (4) has a first, substantially flat side and a second side that is provided with a relief formed by said air pockets (5).

According to the invention, the breathable, water impermeable film (2) is attached to the flat side of said fabric (4), which faces the outside of the protective clothing.

This allows a weight saving to be realized for a given thermal insulation value so that the protective clothing can be constructed from an inner garment and an outer garment, wherein the outer garment, having the water impermeable film therein, can be taken off separately to avoid or reduce contamination of the body with toxic agents.

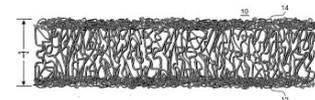
## US2017121922 - Production and application of fire resistant erosion control mat

LIPSCOMB CHAD M (Inventor)

Published 2017-05-04

A fire resistant ground erosion control mat assembly.

The mat assembly includes an inner layer of fire resistant milled stone mineral wool material with an upper and a lower layer of supportive nets.



Each of the upper and lower nets consist of fire resistant milled mineral foraminous nettings to enable passage of light and water therethrough as a ground positioned emplacement of the inner layer.

## WO2017070529 - Lightweight, printable flame resistant fabrics suitable for protective clothing worn in hot and/or humid environments

SOUTHERN MILLS

Published 2017-04-27

Flame resistant fabrics comprising a blend of modacrylic, aliphatic polyamide, and cellulosic fibers. Some embodiments are printed and/or dyed with vat dyes so as to comply with the color requirements (including the color, colorfastness, and IR requirements) set forth in the relevant sections of GL-PD-07-12 and/or MIL-PRF-EFRCE. Some embodiments further include reinforcing yarns that improve the strength of the fabrics. Still other embodiments are flame resistant fabrics for use in electrical applications that comply with some or all of the requirements of ASTM F 1506.

## **WO2017055356 - Halogen free flame retardant waterborne coating composition for textile**

*DSM IP ASSETS*

Published 2017-04-06

The present invention relates to a flame retardant waterborne coating composition comprising: a) water dispersed hydroxyl-terminated polyurethane particles, and b) isocyanate crosslinker, wherein (i) the hydroxyl-terminated polyurethane contains phosphonate oligomer as a building block in an amount of from 3 to 75 parts by weight relative to the hydroxyl-terminated polyurethane, wherein the phosphonate oligomer contains units according to the following structural formula in which n is an integer from 1 to 20, R is a C1-20 alkyl, C2-20 alkene, C2-20 alkyne, C5-20 cycloalkyl or C6-20 aryl, and R2 is an aliphatic or aromatic group, (ii) the hydroxyl number of the hydroxyl-terminated polyurethane is from 5 to 180 mg KOH/g polyurethane, (iii) the molar ratio of hydroxyl groups present in the hydroxyl-terminated polyurethane to isocyanate groups of the crosslinker is from 0.2 to 2.0.

## **GB2542333 - A method of forming a fire retardant fabric without the need to apply a fire retardant composition**

*JOHN SPENCER*

Published 2017-03-22

A method of making a piece of furniture with a fire retardant fabric is disclosed.

Firstly the fabric is formed by weaving a plurality of yarns.

At least one first yarn is made from predominantly cotton fibres and at least one second yarn is made from predominantly wool fibres.

Preferably the cotton forms the warp and the wool is the weft.

A mixed yarn of both cotton and wool may also be used.

Ideally, the fabric comprises 70-75% by weight of cotton and 25-30% by weight of wool, with an area weight between 200-500 g/m<sup>2</sup>.

A frame or substrate of the furniture is also formed and the fabric can be used to at least partially cover the frame or substrate.

This forms an item of furniture which passes the standard fire retardancy tests without the addition of undesirable chemical fire retardant compositions.

**DE102015010524 - Method for producing a flame-retardant fabric for protective clothing, flame-retardant fabric and protective clothing made therefrom**

*TRANS TEXTIL*

Published 2017-02-16

A method for manufacturing a flame-resistant textile material for protective clothing is characterized in that at least one textile layer is subjected to a treatment step wherein at least one fiber component is at least partially detached from the textile layer such that air chambers (5) are formed.

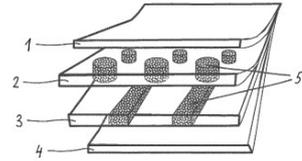


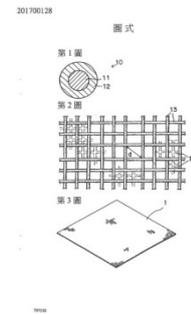
Fig. 1a

**TW201700128 - Fire-resistant fabric having fire extinguishing capability and flame retardancy**

*GUNMA PREFECTURE*

Published 2017-01-01

It is an object of this invention to provide a fire-resistant fabric with fire extinguishing capability and flame retardancy, in addition, the disclosed is characterized by having excellent aesthetics and light fastness as well as excellent feel in hand and skin touch when it is used as indoor articles such as curtains or an apron. In the fire-resistant fabric using modified acrylic fiber, flame-retardant fibers are blended in an all-directional ranged within 5 mm from an arbitrary point on a plane thereon, and an area ratio of the above flame-retardant fibers visually confirmed from the surface is ranged between 0% to 5% with a blending ratio of the above flame-retardant fibers being 10% to 50%.



**WO2016199145 - Antimony free brominated flame retardant system for textiles**

*ICL INDUSTRIAL PRODUCTS*

Published 2016-12-15

The present invention teaches an antimony free brominated flame retardant composition, comprising a brominated flame retardant, an organic phosphorus-containing flame retardant which is an organic phosphate that is either an amorphous solid or a liquid, and a flame retardant which is a source of nitrogen and inorganic phosphorus, this source being amorphous compound. The invention further teaches textile coating formulations comprising these compositions, a process for applying them on textile fabrics, and the flame retarded fabrics coated by these compositions and formulations.

## WO2016194766 - Flame-retardant fabric and protective clothing in which same is used

KANEKA

Published 2016-12-08

The present invention pertains to a fire-retardant fabric containing para-aramid fibers, acrylic fibers, flame-retardant rayon fibers containing a phosphorus flame retardant, and Lyocell fibers, the fabric containing 5-15 wt% of the para-aramid fibers, 50.5-65 wt% of the acrylic fibers, and a total of 15.5-44.5 wt% of the Lyocell fibers and the flame-retardant rayon fibers that contain a phosphorus flame retardant, the amount of phosphorus-flame-retardant-containing flame-retardant rayon fibers contained in the flame-retardant fabric being 10.5 wt% or more in relation to the total weight of the flame-retardant fabric, and the acrylic fibers containing an antimony compound in an amount of 3.9-20 wt% in relation to the total weight of the acrylic fibers.

The present invention also pertains to protective clothing in which the flame-retardant fabric is used.

## WO2016178057 - Method for producing a flameproof and/or waterproof multilayer fabric and flameproof and/or waterproof multilayer fabric

PRATRIVERO

Published 2016-11-10

There is disclosed a method for producing a flameproof and waterproof multilayer fabric comprising the steps of: (a) providing at least one first layer comprising a woven or non-woven fabric; (b) doctoring over the at

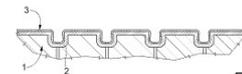


FIG. 2B

least one first layer at least one second layer comprising at least one material selected from the group consisting of acrylic resin, styrene-butadiene-rubber (SBR), ethylene-vinyl acetate resin, polyurethane resin, vinyl resin, acrylonitrile resin and vinyl-versatic resin, thus obtaining an at least two-layered fabric; (c) foaming the at least one second layer of the at least two-layered fabric obtained in step (b) at a temperature from 90°C to 110°C; (d) cold calendering the at least two-layered fabric obtained in step (c); (e) doctoring over the at least one second layer of the at least two-layered fabric calendered in step (d) at least one third layer comprising at least one material selected from the group consisting of polyurethane resin, acrylic resin, styrol-acrylic resin, vinyl-acrylic resin, ethyl-vinyl-acrylic resin, styrene-butadiene-rubber (SBR), ethylene-vinyl acetate resin, vinyl resin, acrylonitrile resin and vinyl-versatic resin, thus obtaining an at least three-layered fabric; (f) heat-setting at a temperature from 120°C to 180°C the at least three-layered fabric obtained in step (e).

## **IN201641032709 - Flame-retardant poultry-feather-fiber non-woven-sheet and process for making the same**

JAGADEESHGOUDA

Published 2016-10-07

The present invention is related to manufacturing of flame-retardant poultry feather fiber blended non-woven sheets or fabrics having moderate strength in the presence of binder materials as pulp of lawn-grass and waste-paper using hydro-entangled technique.

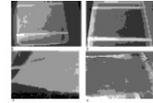


Fig 1 shows various stages in manufacturing of non-woven-sheet using aqueous method

The present invention is also relates to a manufacturing of flame-retardant non-woven sheets or fabrics as insulating material by treating with flame-retardant substance such as alum, specifically potassium aluminium sulphate.

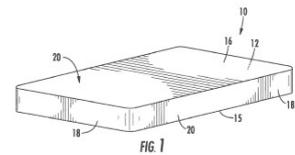
## **EP3053484 - Fire resistant mattresses, fire resistant mattress cover materials**

TRAFALGAR

Published 2016-08-10

Fire resistant mattresses, fire resistant mattress cover materials and related methods are provided.

The fire resistant mattress cover material for use as an outer layer on a mattress can include a three-dimensional knit fabric.



In some embodiments, the three-dimensional knit fabric can include a first layer comprising fire resistant corespun yarns, which can be glass reinforced continuous multifilament micro denier yarns, that form a fire resistant barrier when exposed to at least one of heat or flame and a second layer comprising polymer filament yarns.

The three-dimensional knit fabric can also include a middle layer between the first layer and the second layer.

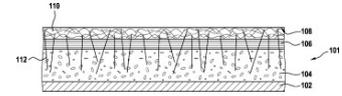
The middle layer can include monofilament polymer yarns knitted to provide structural support and space between the first layer and the second layer.

## DE202016101780 - Sound insulation mat and fire protection mat

RM TECHNISCHE VLIESTOFFE

Published 2016-07-21

Sound insulation mat, a needle felted nonwoven material, the arranged on the sound source side of the sound insulation mat; comprising, - and - a base, with which the nonwoven material is needed.



## DE202016102811 - Protective clothing or articles of clothing, in particular for fire fighters for protection against heat

HOLIK INT S R O

Published 2016-07-14

Protective clothing or garment, particularly for fire for heat protection, a top protective layer and a lower protective layer, between which at least a portion of the surface of the garment or garment inner protective layer is, in, the inner protective layer corrugated foam region.

