The Conductive Surfacing Veil DYMRITON.

Created in 2019.
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E-book by
Dymriton Composites

About Conductive Veil

Conductive Surfacing Veil

In this book, we will explain in detail the reasons for the design of conductive surface felt, the development process, and the effect of use.

Due to its good corrosion resistance and lightweight, plastic has developed rapidly in the use of plastic materials for storage tanks of flammable materials and electronic equipment enclosures. However, a problem often encountered here is that electrostatic charging may occur due to high electrical resistance.

Discharge may be accompanied by sparks, which may cause an explosion hazard. The surface of (fiber-reinforced) plastics usually has a surface resistivity of at least 10 sup.14. Omega. If the surface resistivity is ltoreq. 10.sup. 9. Electrostatic charging is not expected. The volume resistivity is ltoreq. 10.sup. 6.

Combustible gas, vapor, and dry matter/air mixtures can be ignited by the

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Fiber Conductor is superior to powder.

discharge phenomena (sparkover) of electrostatic discharges. The minimum required ignition energy determines the classification of the explosive mixture. Three categories are distinguished, namely:

Class 1--ignition energy .gtoreq.0.30 mWs.
Dry matter/air mixtures require between 10 and 100 mWs.
Class 2--ignition energy 0.025-0.30 mWs.
Vapours of solvents and petrol.
Class 3--ignition energy .ltoreq.0.025 mWs.
Hydrogen, acetylene.

The possibility of making plastics conductive by adding conductive additives is well known. By adding conductive additives such as graphite, carbon, aluminum, silver, and copper powder into plastics, the required conductive properties were obtained. The use of short metal fibers and short metalized fibers is also well known.

An article in “polymer engineering and science”, December 1977, Vol. 17. No. 12 entitled "conductive polymer composition" refers to the use of conductive fibers. The article points out that fiber conductor is obviously superior to powder, flake, and beads. This article is limited to conductive particles and fibers with a maximum aspect ratio of 35:1. The term "aspect ratio" refers

The use of short conductive optical fibers is an expensive thing

to the use of conductive fibers. The article points out that fiber conductor is obviously superior to powder, flake, and beads. This article is limited to conductive particles and fibers with a maximum aspect ratio of 35:1. The term "aspect ratio" refers to the ratio between the length and diameter of a particle.

However, the use of short conductive optical fibers is an expensive thing in terms of the amount required to achieve the desired effect, that is, to obtain a conductive network. This requires up to 40% of the material to be added to the plastics.

The same applies to the use of metal powders. In addition,

There is a problem in filtering these materials through reinforcing materials during the injection of resins with dispersed conductive additives (RTM Technology).

In addition, the mechanical properties of the finished product are negatively affected by these "fillers". Although conductive plastics have long been known, their use in many applications has been subject to negative economic, mechanical, and processing constraints.

The housing of electronic equipment usually needs to shield any electromagnetic radiation. In practice, such shielding is usually obtained by arranging shielding materials inside the housing.

The use of plastic materials for enclosures with inherent shielding properties usually encounters objections, that is, obtaining shielding properties will make the materials very expensive,

We provide a plastic system with conductive properties.

So that their use is prohibitive, or their performance is so poor that the materials cannot be used normally.

We provide a plastic system with conductive properties, which makes it suitable for use in the above fields.

The material relates to the use of a component consisting.

The material relates to the use of a component consisting of at least one non-conductive or substantially non-conductive carrier material and at least one conductive fiber web, which has been provided on at least one side of the carrier material, and the fibers of the conductive web have been in conductive contact with the other side of the carrier material through the carrier material to manufacture a reinforced plastic material.

It also includes a plastic products. The matrix resin is composed of at least one component composed of non-conductive or substantially non-conductive carrier material and at least one fiber net provided on one side of the carrier material. The fibers of the conductive net are in conductive contact with the other side of the carrier material through the carrier material.

We found that by adapting to the existing plastic reinforcement, especially the reinforcement of thermosetting plastics such as polyester resin and epoxy resin, sufficient .

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An important advantages of this products is,

conduction can be obtained while maintaining good material properties. This reinforcement adjustment is equivalent to providing a conductive fiber net on the commonly used carrier material, and the fibers are arranged through the base material, such as acupuncture. In this way, the entire material is conductive. The resulting reinforced plastic material achieves a so-called continuous conductivity.

It provides a system that affects plastic materials and can be used for the above three types of explosive mixtures. In addition, with the help of this reinforcing material, shielding properties can be generated in plastics.

An important advantage of this product is that using multiple layers of this carrier material can form a laminate with sufficiently low continuity resistivity and volume resistivity. Surprisingly, we found that a relatively small amount of conductive fibers through the carrier material provided sufficient conductivity for the laminate. This is not only applicable to the arrangement of the carrier material layer, .

The conductive fiber net is composed of conductive fibers.

i.e. the "bottom-side", that is, when the side with few conductive fibers contacts the conductive network, but also applicable to the two "bottom-side" which have been placed relative to each other.

The conductive fiber net is composed of conductive fibers. Examples include metalized fibers, metal fibers, or fiber webs with conductive additives. If the fiber web is partially or completely composed of metal fibers, the metal of the fibers may be selected from conductive metals and their alloys. Suitable metals are steel, copper, and and nickel. When using metalized fibers, it is better to use nickel, copper, or silver metalized fibers, use alloys based on one or more metals, or continuously use two or more metals. A suitable fiber is an acrylic, which is first metalized with copper and then with nickel.

Conductive fiber web may consist of only conductive fibers,

but a combination of conductive and non-conductive fibers may also be used in the web. In order to obtain excellent conductivity, the length of the conductive fiber is preferably 40-70mm. The web can be thermally bonded, chemically bonded, or mechanically bonded. If so, woven or knitted fabrics may also be used. The amount of conductive fibers must be sufficient to provide the required conductivity. This can be determined by simple experiments. Typically, the conductive fibers in the fiber web will be between 5 and 100 wt.%. Preferably, the amount is 5-25% by weight.%.

As the material of the carrier, various materials can be used. A reinforcing carrier material may

or may not be used. It is also possible to use a core material as a carrier material. Such core materials typically have no reinforcement, although reinforcement core materials can be used. But it has been observed that the carrier material, which may or may not be reinforced, has a conductive mesh disposed of thereon, combined with a core material that may

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Various materials can be used as carrier materials.

or may not be reinforced.

Various materials can be used as carrier materials. Examples of such carrier materials thus include foamed plastics, honeycomb materials, foils that may or may not be perforated, in particular fiber webs that may or may not be woven.

Examples of carrier materials suitable for use with fibers are glass mats, glass fabrics, carbon fabrics, woven fabrics, knitted fabrics, and mats of other types of fibers such as aromatic polyamide. .

Conductive properties are achieved by providing the carrier material.

Conductive properties are achieved by providing the carrier material with conductive fibers placed/dispersed on the carrier material (reinforcing material). The conductive fibers preferably have an aspect ratio of 500 or more. Usually, it will be around 4000-5000.

A practical method with uniform fiber distribution is, for example, a carded web. The fiber mat is then mechanically anchored in and through the reinforcement material. Such mechanical anchoring can be obtained, for example, using a needle machine or a hydroentanglement device. Reinforcements can also be made conductive by stitching conductive yarns/wires/sheets through the reinforcing material.

All anchoring methods in which the conductive fibers extend vertically

through the reinforcement are suitable. Knitting or weaving techniques can also be used, whereby so-called two-dimensional semi- or three-dimensional knitted or woven fabrics are obtained, provided that conductive threads or yarns are used in the vertical direction.

The formation of a conductive web can be achieved by all known techniques for manufacturing fiber webs, more specifically non-woven

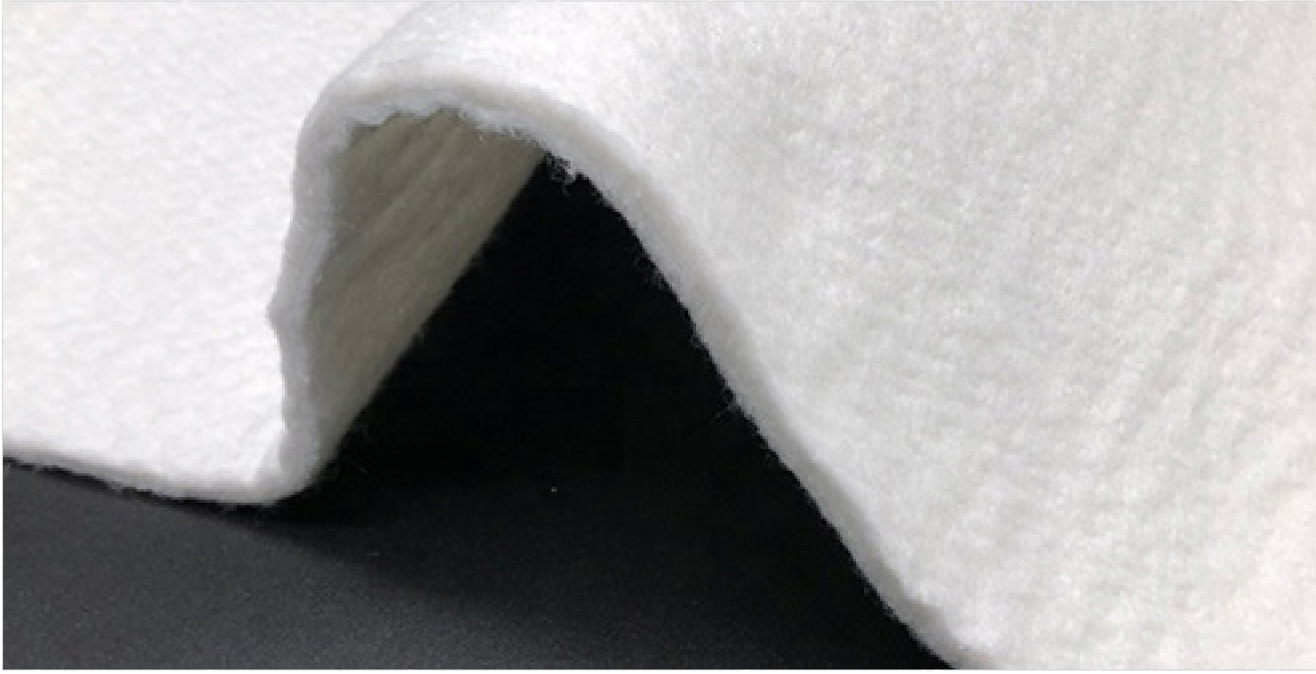
fabrics. By mixing conductive fibers with other fibers, any desired low dose can be basically uniformly distributed and accurately set. According to the conventional method in the production of plastic laminates, the conductive net

Providing a reinforcing material that imparts conductivity

obtained by such stacking forms a permeable conductive material (volume conductivity). For example, this is an attribute necessary for the use of these materials in mining.

It can be observed that by providing a reinforcing material that imparts conductivity at the top layer, the conductivity of the surface only can be obtained. In many cases, this may be sufficient, along with the advantages of simpler component manipulation and processing. In fact, one of the advantages of this material is that when this material is used, fewer operations are required for lamination and impregnation. This is also advantageous for obtaining improved reproducibility of the final material properties.

Conductive layers can be provided at any desired point in the laminate. Additionally, placing the assembly with the



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A smoother conductive surface of the laminate.

conductive fiber web on the outside of the laminate results in a smoother conductive surface of the laminate.The profile of the reinforcement is compensated (cushioning effect). Processability (impregnation) of the reinforcement and mechanical properties of the final product due to the addition of only a small amount of (conductive) fibers to the reinforcement. Even if there were, it would be hard to be negatively affected.

Products can be made from thermoplastics or thermosets. Examples of thermosetting plastics are phenolic resins, epoxy resins, polyester resins, and polyurethane resins. Thermoplastics eligible for use include various engineering plastics such as polypropylene, ABS, and related styrene polymers, polycarbonate, polyetherimide, polyphenylene oxide, polyphenylene sulfide, and blends of these plastics. These plastics can also be reinforced with fibers.

Fibers for conductive webs and carrier materials,

especially acrylic, polyester, glass, carbon, and aramid fibers. Of course, the choice of fiber depends in part on the temperature and mechanical loads that the material must be able to withstand during manufacture and use.

Depending on the material to be used, the final product can be manufactured by different processes. In such systems, the closed die process is usually used. A component provided with a conductive fiber web or a combination of two or more such components is placed in a mold, optionally with other materials that can be used as plastic reinforcement, such as for the manufacture of fiber-reinforced laminates. Suitable methods are resin transfer molding (RTM), vacuum injection, cold pressing, hand pasting, spraying, pultrusion, and GTM (glass mat thermoplastic).

In RTM and vacuum injection, a liquid resin, such as a thermosetting polyester resin, is injected into a closed mold in which one or more

components as described above have been placed.Cold pressing is based on the same technology as RTM, except that the resin is not injected but is pressed into the component during mold closure.

Hand lay-up and spray are techniques in which laminates are built layer by layer (assembly and resin).

" Keep Action, Contact Us to Find Your Solution

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A smooth plastic surface without bubbles can be obtained.

In pultrusion, a component to which resin is added under pressure is pulled into a mold and then cured.

A fiber web, eg, a glass web that has been impregnated with a thermoplastic resin, is deformed in a mold to form a laminate. The starting material may be one or more of such nets, in combination with at least one of the present products. However, components impregnated with thermoplastic resin can also be deformed in this way.

When using a closed mold system in

conjunction with liquid resin, it is best to provide components for use

with a humidifier and/or breather to improve the quality of the material surface. In this way, a smooth plastic surface without bubbles can be obtained.

Finally, it also relates to an assembly comprising at least a web of conductive fibers that has been needled onto a glass mat.

In the following, is illustrated by the following examples, but not limited thereto:

EXAMPLE

On a glass mat of about 450 g/m.sup.2, place a fiber web of about 50 g/m.sup.2. The web contained 10 wt. % metalized (fibers copper plated then nickel plated) fibers

The metalized fibers extend across both surfaces accordingly.

Using a needling machine, the web was bonded to the corresponding glass mat. The metalized fibers extend across both surfaces accordingly.

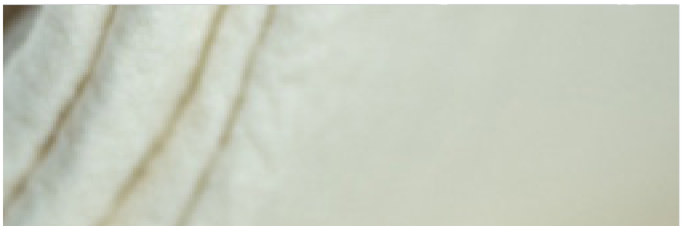
Laminates (RTM) are made using these glass mats with metalized fibers.

Four layers (stacked, i.e., the conductive web against the glass mat) of this electrically conductive reinforcement material were processed into this laminate:

Glass mat:	about 1800 g/m.sup.2 (23.6%)
Fibre web:	about 200 g/m.sup.2 (2.6%)
Polyester resin:	about 5630 g/m.sup.2 (73.8%)

The electrical and mechanical properties of this laminate contain only 0.26 wt. % metal fibers.

In tests without the conductive mesh, comparable E-modulus and flexural strength values were obtained. However,



Our Conductive Veil.

the electrical performance is poor.

Surface resistivity: .ltoreq.30

.OMEGA.#

Continuity resistivity: 1.2 k.OMEGA..cm

E-modulus: 5890 N/mm.sup.2

Bending strength: 141 N/mm.sup.2

An assembly is used comprising at least one non-conductive or substantially non-conductive carrier material and at least one conductive fiber web disposed on at least one side of the carrier material, the fibers of the conductive fiber web being connected to the carrier material by the carrier material. The other side of the carrier material is in conductive contact, the conductive fibers are pres-

Product Statement:

-sent in an amount of 5-100% by weight based on the weight of the fiber web, and have an aspect ratio of 500 or more, for the manufacture of reinforced plastic materials.

This conductive mesh has metal fibers or metalized fibers.

Depending on the end product use, the fibers have been metalized with nickel, copper, or silver, or with alloys based on one or more of these metals.

The carrier material is selected from foamed plastics, honeycomb materials,

Thank you.

Declear :

foils, which may or may not be perforated, and fibrous webs, such as, for example, nonwovens, wovens or knitted fabrics.

The fibers of the web are selected from the group consisting of glass fibers, polyester fibers, carbon fibers, aramid fibers, acrylic fibers, and mixtures thereof.

Final product: The plastic material is made by impregnating the component with a liquid resin and a hardener for it, and then curing the resin.

Where the fibers of the conductive web have been in conductive contact with the other side of the carrier material through the carrier material, the conductive fibers are present in an amount of 5-100% by weight, based on the weight of the carrier web and having a 500 or greater aspect ratio.

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