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(54) Title: NONWOVEN SUBSTRATE FOR JOINT TAPE AND JOINT TAPE THAT IS DIMENSIONALLY STABLE AND FOLDABLE WITHOUT LOSING MECHANICAL STRENGTH CONTAINING SAID SUBSTRATE

(57) Abstract: Nonwoven substrate for joint tape containing vegetable fibres from softwood or hardwood pulp, possibly with synthetic fibres and/or possibly glass fibres, characterised in that it also contains flax fibres obtained by retting. Joint tape including the substrate.

NONWOVEN SUBSTRATE FOR JOINT TAPE AND JOINT TAPE THAT IS DIMENSIONALLY STABLE AND FOLDABLE WITHOUT LOSING MECHANICAL STRENGTH CONTAINING SAID SUBSTRATE

The subject of the invention is a nonwoven substrate for joint tape. It also concerns joint tape containing said substrate, said joint tape being dimensionally stable and foldable without losing mechanical strength.

In a known manner, joint tape is designed to be applied between two panels, notably drywall, to ensure continuity. Such drywall panels can be used on walls and on ceilings, outside or inside. They can be applied in damp rooms such as bathrooms or in dry rooms.

Several kinds of joint tape have been described.

First of all, there is joint tape made of kraft paper strips. In practice, the user applies a first layer of joint compound to the joint between the two panels, upon which the joint tape is then positioned. While drying, the joint tape absorbs moisture from the joint compound, causing it to shrink crosswise, lengthwise and in thickness, thus forming cracks. A second layer of joint compound therefore has to be applied, and often a third layer, in order to eliminate all risk of cracking.

To reinforce dimensional stability crosswise and lengthwise, it has been proposed that glass fibres and synthetic fibres be combined with the paper cellulose fibres at a high proportion of up to 40% by weight, or more, of the fibre weight. Such joint tapes include, for example, those described in the document WO2008/073206A1. The nonwoven substrates thus obtained have dimensional stability that is considered satisfactory for the planned application. Using them in corners is delicate, however, given that the glass fibres contained in the substrate break when folding the tape and when breaking the fold with a spatula.

Joint tape substrates made of nonwoven glass fibres or glass netting are also well known. The first have low breaking strength. The second, on the other hand, have high breaking strength but have the disadvantage of a risk of crack formation on the coating applied.

In other words, the problem that the invention proposes to solve is the development of a joint tape that is dimensionally stable crosswise, lengthwise and in thickness and whose mechanical strength before and after folding is optimal.

To do this, the Applicant has developed a substrate for joint tape containing vegetable fibres from softwood or hardwood pulp, possibly in the presence of synthetic fibres and/or possibly glass fibres. According to an essential characteristic, the nonwoven substrate also contains flax fibres obtained by retting.

Flax fibres obtained by retting can be clearly distinguished from flax fibres from flax pulp. The first can be called "textile fibres" or "unpulped fibres", while the second can be called "paper fibres" or "pulp fibres". The retting technique is a technique used to retrieve fibres directly from the whole plant before transforming it into a pulp. These fibres are characterised by a larger diameter and size than fibres obtained from pulp during the papermaking process. The flax fibres according to the invention may be combed or uncombed.

The Applicant has in fact observed that, quite surprisingly, the presence of textile flax fibres in the substrate solves the problem of breaking strength crosswise after folding and lengthwise.

Vegetable fibres from softwood or hardwood pulp may be raw fibres or bleached fibres from chemical or mechanical paper pulp.

The synthetic fibres may be chosen from the group including polyester, polyethylene, polypropylene, polyamide, polyvinyl chloride, polyvinyl alcohol, acrylic and nylon fibres.

The substrate of the invention can be in the form of a single-layer substrate, a two-layer substrate or more largely a multi-layer substrate. If a two-layer substrate is used, it may be made with all the techniques known to the person skilled in the art, notably by running the preformed upper and lower sheets through a size press.

If a single-layer substrate is used, the flax fibres account for at least 30% by weight of the total fibres, and advantageously between 40 and 50%>.

Likewise, vegetable fibres from softwood or hardwood pulp in practice account for at least 30%, and advantageously 40%>, by weight of the fibre mixture.

At the same time, synthetic fibres, where used, advantageously account for at least 10%> by weight of the fibre mixture.

According to another characteristic, the mass of the single-layer substrate is between 50 and 120 g/m^2, and advantageously between 70 and 100 g/m^2.

If a two-layer substrate is used, the aforementioned proportions concerning the fibres are the same, but in relation to the weight of the fibres comprising the lower layer only. In this case, the fibres comprising the upper layer are advantageously only vegetable fibres from softwood or hardwood pulp. The mass of the upper layer is advantageously between 5 and 30 g/m^2, preferably between 10 and 20 g/m^2. The mass of the lower layer is preferably equal to the value of the mass of the aforementioned single-layer substrate.

In a particular embodiment, the single-layer substrate has the following fibre composition (by fibre weight):

- vegetable fibres from softwood or hardwood pulp 35 to 45%
- glass fibres 25 to 35%
- textile flax fibres 25 to 35%

In another embodiment, the two-layer substrate has the following fibre composition (by fibre weight):

Lower layer:

- vegetable fibres from softwood or hardwood pulp 35 to 45%
- polyester fibres 10 to 20%
- textile flax fibres 40 to 50%

Upper layer:

- vegetable fibres from softwood or hardwood pulp 100%

In another embodiment, the two-layer substrate has the following fibre composition (by fibre weight):

Lower layer:

- vegetable fibres from softwood or hardwood pulp 35 to 45%
- glass fibres 25 to 35%
- textile flax fibres 25 to 35%

Upper layer:

- vegetable fibres from softwood or hardwood pulp 100%

The fibres are, of course, bound together by a binding agent chosen from among the natural or synthetic binders known to the person skilled in the art. In practice, the binding agent is chosen from the group including vinyl acetate, vinyl alcohol, vinyl chloride, acrylic acid, ethyl vinyl acetate, ethyl vinyl chloride, starch and starch derivatives. The binder is added to the substrate at 15 to 40 g/m^2, and advantageously at 20 to 30 g/m^2.

The invention also concerns joint tape containing the nonwoven substrate as described above with an adhesive layer on one side.

The invention and the advantages it provides can be better understood through the following examples of embodiment.

Substrates for joint tape are prepared according to the invention in single-layer and two-layer forms (trials 1 - 4). The mechanical strength of the substrate is measured before and after folding according to the following test:

Folding the sample

The sample is first placed between the 100 mm x 20 mm jaws of an embossing machine; a metal jaw with a raised flute, and a flat jaw with Teflon coating. The sample is placed under 7 bars of pressure for 7 seconds. The flute is situated longitudinally on the sample. The sample is then folded manually so that the 2 sides are folded together on the side opposing the embossed side. The fold is then flattened by rolling a 1-kg roller on the sample. To flatten the two sides against each other perfectly, another 10-kg roller is rolled over the fold twice.

Mechanical measurement

A dynamometer with a 20-mm space between the jaws is used. The sample is 15 mm wide and at least 40 mm long. The fold is placed perpendicular to the direction of pull. A 25 mm/min pull is applied with a 500-N sensor, and the device records tensile

strength, a measurement given in kN/m. The test is repeated 10 times to calculate an average value as well as a standard deviation.

Mechanical strength after folding is considered satisfactory starting at a value of 25 lb/in.

All the results can be found in the following table: the "Ref trial corresponds to the two-layer paper, reference 7136, tested in document WO2008/073206A1, which does not contain flax fibres.

PROTOTYPES							MAIN PROPERTIES			
ID	UPPER LAYER		LOWER LAYER		BINDER	TOTAL g/m²	Mechanical strength crosswise after folding			
							Flat		Folded	
	g/m²	Composition	g/m²	Composition	g/m²		Average	+/-	Average	+/-
Ref	15	50% softwood paper pulp 50% hardwood paper pulp	49	45% softwood paper pulp 44% glass 11% polyester	21	85	26	4	19	2
1	15	50% softwood paper pulp 50% hardwood paper pulp	49	40% softwood paper pulp 44% flax 16% polyester	26	90	33	6	32	4
2	*No lower layer*		66	40% softwood paper pulp 30% glass 30% flax	27	93	30	5	26	3
3	15	50% softwood paper pulp 50% hardwood paper pulp	51	40% softwood paper pulp 30% glass 30% flax	28	94	31	5	29	3
4	14	50% softwood paper pulp 50% hardwood paper pulp	46	40% softwood paper pulp 30% glass 30% flax	22	82	30	3	25	3

Glass fibre: 11 μιη, 4 or 6 mm, by Owens Corning

Polyester fibres: Dacron 1.7 or 6.7 dtex, 12 mm, by ADVANSA

Textile flax fibres by VAN ROBAEYS, scutched, cut to 12 mm, uncombed

As the table shows, the presence of textile flax fibres with or without glass fibres in a single layer or two layers provides satisfactory mechanical strength after folding compared with a Ref paper that does not contain flax fibres.

CLAIMS

1/ Nonwoven substrate for joint tape containing vegetable fibres from softwood or hardwood pulp, possibly with synthetic fibres and/or possibly glass fibres, **characterised** in that it also contains flax fibres obtained by retting.

21 Substrate as claimed in claim 1, **characterised** in that the flax fibres account for at least 30% by weight of the total fibres.

3/ Substrate as claimed in claim 1, **characterised** in that the vegetable fibres from softwood or hardwood pulp account for at least 30%, and advantageously 40%>, by weight of the total fibres.

4/ Substrate as claimed in claim 1, **characterised** in that the synthetic fibres advantageously account for at least 10% by weight of the total fibres.

5/ Substrate as claimed in claim 1, **characterised** in that it has a single layer and mass between 50 and 120 g/m^2, and advantageously between 70 and 100 g/m^2.

6/ Substrate as claimed in claim 1, **characterised** in that it has two layers, the fibres of the upper layer exclusively containing vegetable fibres from softwood or hardwood pulp.

11 Substrate as claimed in claim 1, **characterised** in that it has two layers with the following fibre composition (by fibre weight):

Lower layer:

- vegetable fibres from softwood or hardwood pulp 35 to 45%>
- polyester fibres 10 to 20%>
- flax fibres 40 to 50%

Upper layer

- vegetable fibres from softwood or hardwood pulp 100%

8/ Substrate as claimed in claim 1, **characterised** in that it has two layers with the following fibre composition (by fibre weight):

Lower layer:

- vegetable fibres from softwood or hardwood pulp 35 to 45%>
- glass fibres 25 to 35%>

- flax fibres 25 to 35%

Upper layer

- vegetable fibres from softwood or hardwood pulp 100%

91 Substrate as claimed in claim 1, **characterised** in that the fibres are bound together by a binding agent added at 15 to 40 g/m^2, and advantageously at 20 to 40 g/m^2.

10/ Joint tape containing the nonwoven substrate as claimed in any of claims 1 to 9, with an adhesive layer on one side.

INTERNATIONAL SEARCH REPORT

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PCT/FI201Q/05Q977

A. CLASSIFICATION OF SUBJECT MATTER
INV. C09J7/Q4 D04H1/42 DO4H13/00 E04F21/0O
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C09J D04H E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 37 10 498 Al (MAEHN PHI LI PP [DE]) 13 October 1988 (1988-10-13)	1,3,5
A	the whole document	2,4,6-10
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A	FR 2 705 369 Al (R0BAEYS FRERES SA VAN [FR]) 25 November 1994 (1994-11-25) page 1, line 3 - page 2, line 14; claims 1-6	1-10

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such docu¬ments, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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