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⑤④ **Manufacture of flexible intumescent sheet.**

⑤⑦ Flexible intumescent sheet according to British patent 1 513 808, comprising heat-expandable micaceous mineral, inorganic fibrous material and organic binder, is made on standard board-making machinery incorporating a winding drum, so that a laminar product is obtained, not a monolithic one. The mineral particles in the sheet are thus more uniformly distributed across its thickness, and the product shows less tendency to premature failure in use.

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Manufacture of flexible intumescent sheet

This invention relates to the manufacture of flexible intumescent sheet.

In the specification of British patent 1 513 808 published
5 June 1978 there is described flexible intumescent sheet
comprising heat-expandable micaceous mineral, such as
vermiculite; inorganic fibrous material, for example
refractory aluminosilicate fibres, rockwool or glass fibres;
and organic binder, such as natural rubber, styrene-butadiene
10 rubber, butadiene-acrylonitrile rubber, or other elastomeric
material. The sheet is suitable for use as a mounting for
ceramic catalyst-supports in metal containers, particularly
in automobile exhaust systems. The sheet is of dry bulk
density at least 0.5gm/ml and is typically of thickness 2.5mm.
15 In the manufacture of it a standard paper-making technique is
employed, in which an aqueous suspension of the ingredients
is de-watered as a layer on a Fourdrinier screen, and the
resulting green sheet is compressed to a bulk dry density of

0.5gm/ml or more, and dried at about 90°C to give the final paper. Now, although precautions may be taken to attain substantially uniform distribution of the solid particles of the aqueous suspension across the thickness of the paper, yet
5 it is a matter of great difficulty to ensure this when forming paper of thickness above 2.5mm. What happens is that the particles, especially those of the micaceous mineral, tend to concentrate at that surface of the layer undergoing dewatering which is adjacent to the Fourdrinier screen. A
10 consequence of this lack of uniformity in distribution of the heat-expandable micaceous mineral is that, when the product is used as a mounting for ceramic catalyst supports in automobile exhaust systems, non-uniform expansion of it occurs and there is a tendency (through the strains which are
15 then set up) for premature failure of the mounting to occur.

We have now found that this tendency to non-uniform distribution of the mineral is much reduced if the dewatered sheet is wound onto a drum so as to obtain a laminar product (as in standard board making techniques) instead of forming
15 it (as in paper making techniques) to its desired thickness as a monolithic product.

The invention is further illustrated by the following Example:

EXAMPLE

20 An aqueous suspension of vermiculite ore (70 parts by weight), aluminosilicate fibres sold under the name FIBERFRAX (20 parts by weight) and styrene-butadiene latex sold under the name HYCAR (equivalent to 10 parts by weight solids) is prepared as in Example 1 of British patent specification
25 1 513 808, and to it is added alum solution to reduce the pH to 4.5. The suspension is then pumped to the head box (flow box) of a standard board making machine ("intermittent machine"), generally as described on page 291, Chapter 12,

of "Paper and Board Manufacture" by Julius Grant,
James H Young and Barry G Watson (publishers: Technical
Division, the British Paper and Board Industry Federation,
London 1978). The slurry is distributed from the head box
5 over the width of the water-permeable conveyor felt of the
machine and is progressively de-watered as it travels on the
felt. From the felt, the de-watered layer is passed to the
drum (or 'making roll') of the machine, on which it is wound
until a thickness of 5mm has been built up. The hollow laminar
10 cylinder formed is then slit axially, and the sheet thus
released is laid flat and dried to moisture content of about
2% by weight.

If desired, operation of the drum can be continued until a
thickness of 10mm or more has been built up.

CLAIMS

1. A process for the manufacture of flexible intumescent sheet by dewatering a layer of aqueous suspension comprising heat-expandable micaceous mineral, inorganic
5 fibrous material, and organic binder, and drying the dewatered layer to a sheet of bulk dry density at least 0.5 gm/ml, characterised in that the dewatered layer is before drying wound onto a drum so as to obtain a laminar product.
- 10 2. A process according to claim 1, in which the laminar layer formed on the drum is of thickness greater than 2.5mm.
3. A process according to claim 1 or 2, in which the inorganic fibrous material is refractory aluminosilicate fibre.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X,Y	GB-A-2 001 371 (REDCO) * Whole document; in particular page 1, lines 10-31; page 3, lines 31-35 *	1-3	D 21 F 13/04 D 21 H 5/00
D,Y	--- GB-A-1 513 808 (MINNESOTA MINING AND MANUFACTURING CO.) * Whole document; in particular page 2, lines 14-16 *	1,3	
A	--- H. HENTSCHEL VON OBERING: "Chemische Technologie der Zellstoff- und Papierherstellung", 3rd edition, 1967, pages 552-559, VEB Fachbuchverlag Leipzig, DD		
A	--- US-A-3 954 556 (F.L. JACKSON et al.)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	--- US-A-3 954 555 (D.R. KOLE et al.)		D 21 F D 21 H
A	--- US-A-3 576 708 (R.C. BREINER) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-07-1987	Examiner NESTBY K.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			