

# PATENT SPECIFICATION

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## (54) MOISTURE RESISTANT COMPOSITE PACKAGING MATERIAL

(71) We, UNILEVER LIMITED, a company organised under the laws of Great Britain, of Unilever House, Blackfriars, London EC4, England, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to packaging material and particularly to a moisture resistant composite material comprising cardboard, paperboard or similar foldable board material.

When materials such as detergent powder are packaged in cartons it is usually desirable to provide some protection against moisture ingress. This is usually achieved by means of a barrier layer which may be incorporated in a laminate as a layer of hot melt wax, polyethylene or bitumen.

It is also desirable that the material from which the carton is to be made has a suitable mechanical form so as to have a specified bursting strength and compressibility as well as being able to be printed on and to be handled by filling machinery. In this respect a problem arises in that increased mechanical strength is usually achieved by use of denser or thicker material but this is heavier and more costly.

Taking these problems into account, the present invention provides a moisture resistant composite material, particularly to form cartons for packaging moisture sensitive materials such as detergent powder comprising

a first layer of board material to form a facing layer;

a second layer of Kraft Paper which is corrugated and attached to the first layer; and

a third layer of board material which is attached to the second layer, either the first or the third layer being a laminate of two sheets of board material with a thermoplastic moisture barrier therebetween.

The first layer will preferably have a weight per area in the range 150—250 gm (gm/sq. mtr.) or more advantageously from 190—230 gm. A board material from kraft pulp, so-called Kraft paper is suitable, and it generally should have a white outer surface suitable for printing on. White duplex board is such material. This layer may be pre-printed prior to assembling the other two layers. Alternatively, the complete assembled "fluted" board may be taken up for printing through special offset printing processes.

The second layer should preferably have relatively small corrugations—in the region of 290—320 corrugations per metre (so-called E-flute corrugations) where the corrugations are between 1.1 and 1.2 mm high. The board material should have a weight per area in the range of 50—150 gm. Kraft paper is suitable.

The third layer may provide a moisture barrier by the incorporation of a suitable moisture excluding thermoplastic material. Bitumen or polyethylene should be used in preference but other materials in layer form such as hot melt wax are also suitable. The weight per area of the two laminate sheets in said third layer may each be somewhat less than that in the other two layers. Between 30 and 100 gm is preferable for each of these layers.

A further preferred feature of the invention is to arrange for the flute direction of the corrugated layer to be transverse to the grain direction of the said first layer of board material.

Three embodiments of specific forms of the invention will now be outlined purely by way of example.

#### EXAMPLE 1

5	Carton Size 200 gms & 450 gms	Specification a) Top ply —190 gm white Duplex board b) Middle ply—60 gm Kraft paper "E" flute c) Bottom ply—39/39 gm Kraft paper polyethylene 100 gauge sandwiched.	5
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#### EXAMPLE 2

10	Carton Size 750 gms×1000 gms	Specification a) Top ply —190 gm white Duplex board b) Middle ply—80 gm Kraft paper "E" flute c) Bottom ply—48/48 gm Kraft paper polyethylene 100 gauge sandwiched.	10
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	Note	a) Dextrin/PVA glue for fabrication; b) No "washboard" effect on printing; c) Flute direction parallel to carton height and grain direction of white board perpendicular to flute direction; d) Polysandwich layer 100 gauge should be free from pinholes; e) Min. bursting strength for (1)—5.0 kg/sq. cm (2)—6.0 kg/sq. cm f) Min. compression strength for (1)—15 kg/carton (2)—20 kg/carton g) MVTR—Max. 15 gm/sq. metre/24 hours (Moisture Vapour Transmission Rate).	20 20 25 30
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#### EXAMPLE 3

	Carton Size 1.5 kg carton 2.0 kg carton & 2.5 kg carton	Specification a) Top ply —230 gm white Duplex board b) Middle ply—100 gm Kraft paper "E" flute c) Bottom ply—48/48 Kraft paper polyethylene 100 gauge sandwiched.	
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	Note	a) Dextrin/PVA based glue is used; b) No "washboard" effect on printing; c) Fluting parallel to carton height and grain direction of white board perpendicular to flute; d) Polysandwich layer 100 gauge should be free from pinholes; e) Min. bursting strength—6 kg/sq. cm; f) Min. compression strength—30 kg/carton g) MVTR—Max. 15 gm/sq. metre/24 hours.	40 45
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#### WHAT WE CLAIM IS:—

50	1. A moisture resistant composite material, particularly to form cartons for packaging moisture sensitive materials such as detergent powder comprising a first layer of board material to form a facing layer; a second layer of Kraft paper which is corrugated and attached to the first layer; and a third layer of board material which is attached to the second layer, either the first or the third layer being a laminate of two sheets of board material with a thermoplastic moisture barrier therebetween. 2. A composite material according to Claim 1 in which the first layer is Kraft paper having a weight per area in the range 150—250 gm/sq. metre. 3. A composite material according to Claim 1 or Claim 2 in which the second	50 55
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layer has corrugations in the range 230—320 corrugations per metre and a weight within the range 50—150 gm/sq. metre.

4. A composite material according to any one of claims 1 to 3 in which the third layer incorporates the moisture barrier laminate and each of the two sheets forming the third layer laminate has a weight in the range 30 to 100 gm/sq. metre.

5. A composite material according to Claim 4 in which said moisture barrier is a layer of bitumen or polyethylene.

6. A composite material substantially as herein described with reference to any one of the three examples.

7. A detergent carton made from moisture resistant composite material according to any one of the preceding claims.

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