

BREATHABLE BAFFLE COMPOSITE

This invention relates to a sanitary napkin and
5 particularly to a gas permeable baffle for sanitary
napkins.

Sanitary napkins are made of three separate
10 components. An absorbent component is generally covered by
a fluid permeable nonwoven cover material which is designed
to abut the body of the wearer. A fluid impermeable baffle
is provided to prevent leakage from the absorbent portion
of the napkin into the garment of the wearer.

15 These baffles may be positioned directly against the
absorbent with the cover in the form of a wrap which
extends over and surrounds the baffle, or the baffle may be
external to the wrap thereby providing an outer bottom-most
surface for the sanitary napkin. Over the past decade,
20 sanitary napkins having these external baffles have become
more prevalent. One of the reasons for this is the
increasing popularity of napkins of reduced bulk. These
napkins which are of the panty liner or the maxi thin type
do not require the cover to function as a complete pad wrap
25 for purposes of stability. Also, ease of manufacture of
these napkins dictates that the baffle be placed externally
to the other components on the bottom of the napkin.
Baffles have traditionally been made of a thermoplastic
film which, while thin and inexpensive, tend to make noise
30 when the wearer walks and also chafe the wearer's skin. In
addition, while these baffles are fluid impermeable, they
are also vapor impermeable. This means that perspiration

resulting from wear is not easily removable from the napkin and vaporized moisture from napkin discharge remains within the napkin confines. Of course, this gas impermeable baffle prevents circulation of air which intensifies the
5 odors associated with menstruation.

In addition, baffles which are external to the other napkin components, must have sufficient strength and integrity to receive garment attachment adhesive and resist tearing after the garment attachment adhesive is removed
10 from the undergarment of the wearer when the napkin is changed.

Several attempts have been made in the past to design an acceptable fluid impermeable moisture permeable baffle. Representative prior art is U.S. Patent 3,595,235 which
15 discloses such a baffle without a description of how it is to be provided. U.S. Patent 3,989,867 which discloses a baffle made of tapered hollow bosses in a polyethylene film which is allegedly impervious to fluids while pervious to gases. British Patent Application 2,035,092 discloses a
20 backing for an absorbent article formed of a polyester-rayon nonwoven with coating of a liquid repellent breathable adhesive. U.S. Patent 4,338,371 discloses a liquid impermeable gas permeable backing of spandex polyolefin fibers. U.S. Patent 4,240,416 discloses a
25 nonwoven cover of binder free synthetic fibers i.e., a spunbonded nonwoven web which has a wetting agent coated only on the body contact side. The patent discloses that the untreated back of this web is air permeable and fluid penetration resistant. U.S. Patent 4,059,114 discloses a
30 panty liner product with a meltblown baffle which is supposedly fluid impermeable and gas permeable made from a meltblown web of polypropylene fibers. There are several other patents, in addition, which treat coating of cellulosic material to withstand fluid penetration and

depending on the nature of the treatment, these baffle layers may also be gas permeable.

Each of these patents provides baffles which are defective either from the standpoint of effective
5 fluid blocking, strength which will resist tearing while providing a suitable adhesive anchor for garment attachment adhesive, or softness and quietness.

According to one feature of the present invention there is provided a sanitary napkin comprising
10 a fluid pervious cover on a top surface, an essentially liquid impermeable and gas permeable baffle on a bottom surface and an absorbent positioned therebetween; said baffle being formed by a composite of a meltblown polymeric web having a basis weight of between
15 13.0 and 28.0 grams per square meter and a spunbonded polymeric web having a basis weight of at least 8 grams per square meter.

According to a further feature of the present invention there is provided a composite material
20 for use in the production of a sanitary napkin, the said composite material comprising a meltblown polymeric web having a weight of between 13.0 and 28.0 grams per square meter and a spunbonded polymeric web having a weight of at least 8 grams per square
25 meter.

The sanitary napkin and composite material according to the invention preferably have a pressure sensitive garment attachment adhesive applied to the outer surface of the spunbonded polymeric web.

30 The present invention thus provides an external baffle for a sanitary napkin having a soft cloth-like feel. This baffle has sufficient strength and internal integrity to provide an anchor for garment attachment adhesive while resisting tearing
35 when the sanitary napkin is removed from the undergarment by the user. Gas permeability and protection against fluid leakage is provided by this baffle which

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is a composite of a meltblown web and a spunbonded web with the spunbonded web preferably providing the exterior anchoring surface for garment attachment adhesive.

5 The invention may be more readily understood by reference to the drawings in which:

FIGS. 1 and 2 are end cross sections of different configurations of sanitary napkins having external baffles.

10 As can be seen in FIG. 1, a sanitary napkin N has an absorbent component 12 completely encircled by a fluid pervious cover 11. Attached to the bottom overlap portion of the fluid pervious cover 11 is the baffle 10 of this invention having layers
15 13 and 14. Layer 13 is a meltblown microfibrous web produced by a conventional melt-blowing process. In this process, a molten polymeric resin is extruded through a plurality of die openings into a converging stream of hot gas. The hot gas may, for example,
20 be provided through gas slots positioned immediately above and below the die openings. The hot gas moves at rates relative to the rate of polymer flow which attenuate the polymer into fibers having micron-sized diameters. The fibers are collected
25 as a nonwoven mat on a continuously moving surface positioned at a distance away from the die openings. The polymeric resin may, for example, be composed of a polyolefin resin, such as polypropylene. A smooth molten flow of the polymeric resin and
30 a smooth attenuation of the fibers are achieved by appropriately selecting and controlling the die tip temperature, resin flow rate and resin molecular rate. This process is described in Naval Research Lab Report No. 4364 of May 25, 1964 but
35 melt-blowing processes are well known, and a representative technique is also for example described in GB Patent No. 1424717. The baffle layer facing the absorbent is preferably made of polypropylene although other olefinic fibers may be used. It is preferred that

5 this web contain relatively small orifices and this is accomplished by utilizing small diameter fibers generally in the range of 10 microns or below which are closely formed to provide small capillaries. A suitable web with these microfibers has a basis weight between 13.0 and 28.0 grams per square meter. The relatively small capillaries provide for gas and vapor transfer while minimizing but not completely stopping fluid transfer. It has been found that meltblown webs of this type do not have the strength to resist tearing when a garment attachment adhesive is applied directly to it and, therefore, it is totally unsuitable as a baffle material. Also, while a meltblown baffle can be rendered fluid impermeable by densifying the web to a considerable extent, the desirable textural properties are destroyed when this is done.

Attached to the meltblown web 13 is a separate spunbonded web 14. Spunbonded polyolefinic webs are described for example in U.S. Patent 3,692,618 which is hereby incorporated by reference. This spunbonded polyolefinic filament web when maintained at a basis weight of not less than 8 grams per square meter provides sufficient strength for the addition of garment attachment adhesive and the subsequent removal of the napkin from the undergarment without tearing of the baffle. Due to low product weight and fiber filament size, the spunbonded web does not provide a gas or vapor barrier even when joined to the meltblown web.

A way of measuring textural feel of cloth or other webs is a measurement of "hand". Hand is a combination of surface friction and flexural rigidity. A conventional apparatus used for measuring these characteristics are a Thwing-Albert Handle-o-meter. Such a device has an opening over which the material to be measured is placed. A push rod then is lowered at a constant rate of speed and the force necessary to bend the textile sample through the

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opening is measured. On a Handle-o-meter Model 211-5, having a slot opening of 0.5 inches (13mm), a penetrator blade i.e., push rod of 0.125 inches (3mm) and a product sample size of 4" x 4" (102 x 102mm), the hand measurement is between 12 and 20
5 grams for a suitable flexible baffle composite. The baffle composite can be formed by permanent adhesive bonds or, more preferably, by fusing as shown by a fusing pattern with individual fuse spots 15 in FIGS. 1 and 2. If the baffle components are to be fused, the spunbonded and the
10 meltblown baffle material must be compatible, i.e., they must melt at approximately the same temperature to provide the joining of the layers. If the webs are fused which, as is well known in the art, can be readily done under suitable conditions of heat and pressure, the bond area
15 between the baffle layers is not less than 5% and is preferably between 10 and 25%. Obviously, no fluid will pass at the particular bond sites.

It may be desirable to add a water repellent coating to the baffle composite. The composite after formation can
20 be readily subjected to a dip process and a suitable water-proof coating for the composite is a 3M fluorocarbon water repellent designated as FC-808. Other suitable fluorocarbons may also be employed and, less preferred, because of the negative textural effects are the silicone
25 water repellent treatments. The baffle composite itself may be attached to the other components of the napkin adhesively or by fusing them to the nonwoven web or the bottom of the absorbent component or to both. In the embodiment depicted at FIG. 2, a nonwoven thermoplastic
30 cover is fused to the composite baffle where the edges of the baffle and cover extend beyond the periphery of the absorbent at either side of the sanitary napkin.

It is apparent that the baffle described herein can also be used for other absorbent products although strength
35 and resistance to tear will not be as great a factor where

there is no pressure sensitive garment attachment adhesive employed.

US 3,692,618 referred to earlier describes a suitable method for making spun bonded polyolefinic webs. In this method a plurality of continuous filaments are simultaneously spun and then gathered into untwisted bundles of at least 15 filaments, the bundles being arranged side-by-side and evenly spaced in a straight row. The bundles are drawn downwards at at least 3,000 metres per minute through a stream of hot gas, for instance past a row of air guns, and impinge onto a carrier belt. By control of the stream of hot gas the bundles are caused to oscillate in a direction transverse to the direction of travel of the carrier and diverge into sub-bundles, thus laying down a web containing a plurality of parallel sections, each section comprising a sub-bundle in a zig-zag pattern and each section in contact with the adjacent section.

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CLAIMS:

1. A sanitary napkin comprising a fluid pervious cover on a top surface, an essentially liquid impermeable and gas permeable baffle on a bottom surface and an absorbent positioned therebetween; said baffle being formed by a composite of a meltblown polymeric web having a basis weight of between 13.0 and 28.0 grams per square meter and a spunbonded polymeric web having a basis weight of at least 8 grams per square meter.
2. A sanitary napkin as claimed in claim 1 wherein a pressure sensitive garment attachment adhesive is applied to the outer surface of the spunbonded polymeric web.
3. A napkin according to Claim 1 or Claim 2 wherein the composite is formed by fusing.
4. A napkin according to Claim 3 wherein the fused bond area is at least 5%.
5. A napkin according to Claim 4 wherein the fused bond area is between 10 and 30%.
6. A napkin according to any of the preceding claims wherein the meltblown polymeric web is made of a polyolefin.
7. A napkin according to claim 6 wherein the polyolefin is polypropylene.
8. A napkin according to any of the preceding claims wherein the meltblown polymeric web is made of polymeric microfibers having diameters of 10 microns or below.
9. A napkin according to any of the preceding claims wherein the polymers of the meltblown polymeric web and the spunbonded polymeric web are compatible.



10. A napkin according to any of the preceding claims wherein the spunbonded polymeric web is made of a polyolefin.

5 11. A napkin according to any of the preceding claims wherein the composite has been treated with a fluid repellent compound.

10 12. A napkin substantially as herein described with reference to and as illustrated in Fig. 1 or Fig. 2 of the accompanying drawings.

13. A composite material for use in the production of a sanitary napkin, the said composite material comprising a meltblown polymeric web having a weight of between
15 13.0 and 28.0 grams per square meter and a spunbonded polymeric web having a weight of at least 8 grams per square meter.

20 14. A material according to claim 13 wherein the composite is formed by fusing.

15. A material according to claim 14 wherein the fused bond area is at least 5%.

25 16. A material according to claim 15 wherein the fused bond area is between 10 and 30%.

30 17. A material according to any of claims 13 to 16 wherein the meltblown polymeric web is as defined in any of claims 6 to 8.

18. A material according to any of claims 13 to 17 wherein the polymers of the meltblown polymeric web and the spunbonded polymeric web are compatible.

35 19. A material according to any of claims 13 to 18 wherein the spunbonded polymeric web is made of a polyolefin .



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20. A material according to any of claims 13 to 19 wherein a pressure sensitive garment attachment adhesive is applied to the outer surface of the spunbonded polymeric web.

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21. A material according to any of claims 13 to 20 which has been treated with a fluid repellent compound.