

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(PCT Rule 71.1)

To:

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Date of mailing
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Applicant's or agent's file reference
067481-00320-23-P-0070-WO

IMPORTANT NOTIFICATION

International application No.
PCT/US2024/028846

International filing date (day/month/year)
10.05.2024

Priority date (day/month/year)
12.05.2023

Applicant
Berry Global, Inc.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 067481-00320-23-P-0070-WO	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/US2024/028846	International filing date (day/month/year) 10.05.2024	Priority date (day/month/year) 12.05.2023	
International Patent Classification (IPC) or national classification and IPC INV. D04H3/147			
Applicant Berry Global, Inc.			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ a total of <u>9</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ a separate electronic file containing a sequence listing (<i>sent to the International Bureau only</i>)			
4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☐ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☐ Box No. VII Certain defects in the international application ☐ Box No. VIII Certain observations on the international application			
Date of submission of the demand 12.03.2025		Date of completion of this report 01.04.2025	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0		Authorized officer Saunders, Thomas Telephone No. +49 89 2399-4425 	

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US2024/028846

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a) and (b))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-25 filed with the demand for preliminary international examination

Claims, Numbers

1-15 filed in electronic form on 12-03-2025

Drawings, Sheets

1/7-7/7 filed with the demand for preliminary international examination

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 5. ☐ This report has been established:
 - ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2024/028846

6. ☒ With regard to top-up searches (Rules 66.1 *ter* and 70.2(f)):
- ☒ A top-up search was carried out by this Authority on 14.03.2025 (all discovered documents are listed in the Supplemental Box Relating to Top-up Search).
 - ☐ Additional relevant documents have been discovered during the top-up search.
 - ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.
7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded".

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-15</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-15</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-15</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item I

Basis of the report

1. Claim 1 corresponds to claim 1 and Figure 1, read in combination with page 13, lines 14-17 of the originally filed application. Claim 3 is based on originally filed claim 3. The remaining claims are identical to those as originally filed.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

2. Reference is made to the following documents:

- | | |
|----|--|
| D1 | WO 2009/026092 A1 (FIBERWEB INC [US]; FARELL GREGORY W [US]; WILLIS EDWARD KEITH [US]) 26 February 2009 (2009-02-26) |
| D2 | US 5 730 821 A (JOEST ROLF HELMUT [DE] ET AL) 24 March 1998 (1998-03-24) |
| D3 | WO 2022/150771 A1 (FITESA SIMPSONVILLE INC [US]) 14 July 2022 (2022-07-14) |
| D4 | WO 2006/107695 A2 (UNIV NORTH CAROLINA STATE [US]) 12 October 2006 (2006-10-12) |
| D5 | US 3 989 788 A (ESTES JR LELAND LLOYD ET AL) 2 November 1976 (1976-11-02) |
| D6 | WO 2020/096792 A2 (BERRY GLOBAL INC [US]; MUSLET IYAD [US]; VYAS ANIKET [US]) 14 May 2020 (2020-05-14) |

2. Novelty (Article 33(2) PCT)

The subject-matter of claims 1-15 is novel.

2.1 D1 discloses (cf. Figure 2; Examples) a process for producing a spunbond comprising e.g. (i) a mixture of PET and IPA-modified coPET filaments, (ii) PET core/PET sheath bicomponent filaments, wherein the core and sheath materials have different IV values, (iii) PET core/IPA-modified coPET sheath bicomponent filaments, or (iv) PET core/PET sheath bicomponent filaments, wherein the core and sheath materials have different IV values. The filaments (14, 16) are deposited onto a moving collection belt (24) and transported through a steam consolidator (32), in which an HSO takes place, after which the intermediate web is passed through a hot-air bonder (34) for final consolidation.

The steam consolidator is described in more detail in D5 (cf. Figures 1-3), where it can be seen that the precursor web is restrained between the collection belt and the surface of the cylinder labelled (25) in D5. Exposure to steam in the consolidator causes the lower melting filament (component) to become tacky whilst it is restrained between the belt and cylinder, leading to an HSO.

D1 and D5 fail to make any mention of a cooling step in the steam consolidator.

2.2 D1 is concerned with a melt bonding process rather than heat setting.

D2, which specifically relates to a heat setting process for melt-spun nonwovens, is therefore a more relevant closest prior art document than D1.

D2 discloses (cf. Fig. 1) a process for producing a spunbond nonwoven with monocomponent filaments, in which the web is heated and subjected to biaxial stretching between two opposing endless belts which define an extended nip, before being heated with hot air and wound up onto a roll.

The subject-matter of claim 1 differs from D2 in that (i) the meltspun fibres comprise two components having different melting points and (ii) the web is subjected to a cooling step prior to exiting the nip, therefore claim 1 is novel.

2.3 Since the process of claim 1 is novel, so a method incorporating it - as described in independent claim 14 - must be novel too.

3. Inventive Step (Article 33(3) PC)T

The subject-matter of claims 1-15 is inventive.

3.1 The objective problem to be solved can be regarded as the provision of an alternative process for forming a nonwoven fabric by melt-spinning fibres onto a moving collection belt and then conveying the precursor web through a heat-setting nip.

3.2 The proposed solution is to use a precursor web comprising at least two components having different melting points and to cool the web before it exits the heat-setting nip.

It is credible that the process according to claim 1 will be capable of forming a nonwoven fabric.

3.3 The solution proposed in claim 1 is inventive for the following reasons:

It is common general knowledge to produce spunbond nonwovens comprising two or more filaments of polymer material with different melting points and/or comprising bicomponent filaments in which the sheath material has a lower melting point than the core material.

However, there is no hint in any of D1-D6 to include a cooling step in the heat-setting nip. Conventionally, cooling is performed after heat-setting and this common general knowledge teaches the skilled person away from performing any type of active cooling step in the heat-setting nip.

Claim 1 is therefore inventive; the same reasoning applies to claim 14.

IN THE EUROPEAN PATENT OFFICE
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

APPLICANT: BERRY GLOBAL, INC.
INTERNATIONAL APPLICATION NO.: PCT/US2024/028846
INTERNATIONAL FILING DATE: 10 MAY 2024
TITLE: PROCESS FOR BONDING AND HEAT
SETTING NONWOVEN WEBS

Authorized Officer: Thomas Saunders

European Patent Office
P.B. 5818 Patentlaan 2
NL – 2280 HV Rijswijk

RESPONSE TO THE FIRST
WRITTEN OPINION ON PRELIMINARY EXAMINATION

Dear Officer Saunders:

This communication is in response to the Written Opinion, dated 02 October 2024, from the International Search Authority (ISA). Applicants have submitted herewith amendments under Article 34, as described more fully below, to correct certain defects in the claims and to more particularly distinguish the claimed invention from the cited references. In addition and as also described more fully below, Applicants have provided remarks explaining the patentability of the claimed invention to overcome the defects noted in the Written Opinion. Applicants respectfully request reconsideration in light of these amendments and remarks and issuance of a favorable International Preliminary Report on Patentability.

In accordance with the Article 34 amendments, independent claim 1 has been amended to recite “subjecting the precursor nonwoven web to a cooling step prior to exiting the heat-setting nip.” Support for these amendments can be found throughout the present application including, for example, page 12, lines 17-22; page 13, lines 23-26; and page 13, line 34 through page 14, line 9. A “marked-up” copy of the claims has been provided to easily identify the claim amendments. A clean copy of the amended claims is also provided with this response.

For the reasons provided below, Applicant respectfully submits that all claims as set forth in the clean copy of the amended claims, as submitted under Article 34 on even date herewith, are patentable over the cited references.

REMARKS

The Written Opinion finds that claims 1, 4, 7, 12, and 13 are anticipated, while claims 1-5, and 7-15 lack inventive step. The Written Opinion finds that claim 6 appears to be patentable.

In particular, the Written Opinion argues that WO 2009/026092 (D1) anticipates claims 1, 4, 7, 12, and 13. The Written Opinion also argues that claims 2-3, 5, 8-11, and 14-15 lack inventive step over D1 in view of US 5,730,821 (D2), WO 2022/150771 (D3), WO 2006/107695 (D4), and US 3,989,788 (D5). WO 2020/096792 (D6) was merely cited for showing that it was known to laminate a nonwoven fabric to a film.

As noted above, independent claim 1 has been amended to recite “subjecting the precursor nonwoven web to a cooling step prior to exiting the heat-setting nip.” As noted below, the cited art fails to teach this aspect of the currently claimed invention.

D1 is directed to an area-bonded nonwoven fabric and method of making the same. D1 generally teaches the use of a first polymer component that is semi-crystalline in nature as a matrix fiber and a second polymer component that is substantially amorphous in nature. Due to the amorphous nature of the second polymer component relative to the first polymer component, the second polymer component behaves as a binder upon sufficient heating. D1 teaches that the web of unbonded fibers may first be subjected to a steam consolidator, as shown in U.S. 3,989,788, prior to complete bonding.

D1, however, does not teach or suggest an HSO in which the precursor web is physically restrained through both a heat-induced annealing step and a cooling step as currently recited in independent claim 1. U.S. 3,989,788 also fails to teach or suggest this feature. As such, D1 fails to render any claims unpatentable.

D2 is directed to a process for producing nonwoven fabrics including steps of heating a mat of collected filaments to a stretching temperature and stretching the mat at said stretching temperature biaxially in a longitudinal direction and in a transverse direction by

100% to 400% to form a biaxially stretched mat, followed by bonding the biaxially stretched mat.

Applicant notes that the post-heating operation of D2 is performed in conjunction with stretching the filaments of the web, which is opposite to the currently claimed subject matter. In this regard, D2 fails to cure the deficiency of D1.

D3 is directed to nonwoven fabrics comprising a single layer in which the single fabric layer comprises a plurality of different fibers, in which each fiber type has desired functionality. In this regard, a system disclosed by D3 uses a spin beam having a zoned distribution plate disposed upstream of a spinneret, in which the zoned distribution plate includes a plurality of distribution apertures arranged in zones. Each zone is configured and arranged to extrude a plurality of polymer streams that are of a different polymer type than polymer streams extruded by an adjacent zone to the spinneret to form a single layer having two or more types of fibers that are of a different type from each other.

Similar to D2, however, D3 fails to cure the deficiency of D1.

D4 is directed to a method of producing a nonwoven fabric comprising spinning a set of bicomponent fibers which include an external fiber component and an internal fiber component. The external fiber component enwraps the internal fiber component and has a higher elongation to break value than the internal fiber component and a lower melting temperature than the internal fiber component. The set of bicomponent fibers are positioned onto a web and thermally bonded to produce a nonwoven fabric

D4, however, fails to cure the deficiency of D1.

D5, as noted above is the patent referenced by D1. D1 discloses process for continuous bonding of a fibrous non-woven web of polyethylene terephthalate matrix and copolyester binder filaments. The process includes steps of steam treating a nonwoven web under restraint thereby consolidating the web, removing the restraint, transferring the consolidated web from the moving belt to a bonder, and finally bonding the web with a flow of hot air through the web.

Similar to D1, however, D5 does not teach or suggest an HSO in which the precursor web is physically restrained through both a heat-induced annealing step and a cooling step as currently recited in independent claim 1. As such, D5 does not cure the deficiency of D1.

As noted above, D6 was merely cited for showing that it was known to laminate a nonwoven fabric to a film. D6 also fails to cure the noted deficiency of D1.

CONCLUSION

All of the points raised by the ISA and Written Opinion have now been addressed by clear and proper amendments to the claims of the pending application. Accordingly, Applicants respectfully request that a favorable International Preliminary Report on Patentability indicate the same.

Respectfully Submitted,



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Docket No.: 067481/00320/23-P-0070-WO

CLEAN CLAIMS

THAT WHICH IS CLAIMED:

1. A process for forming a nonwoven fabric, comprising:

(i) depositing at least a first nonwoven layer comprising a first plurality of interlaid individual meltspun fibers directly or indirectly onto a moving collection belt to provide a precursor nonwoven web having an average initial cross-direction (CD) width and/or an average initial basis weight,

wherein the first plurality of individual meltspun fibers comprise (a) a combination of a first group of monocomponent fibers having a first onset of melting temperature and a second group of monocomponent fibers having a second onset of melting temperature that is lower than the first onset of melting temperature, (b) bicomponent fibers including a first component having a first onset of melting temperature and a second component having a second onset of melting temperature that is lower than the first onset of melting temperature, or (c) a combination of a first group of bicomponent fibers having a first higher melting point component and a first lower melting point component, and a second group of bicomponent fibers having a second higher melting point component and a second lower melting point component that begins melting prior to the first lower melting point component;

(ii) conveying the precursor nonwoven web through a heat-setting operation (HSO) comprising (a) restraining the precursor nonwoven web directly or indirectly within a heat-setting nip defined between the moving collection belt and a portion of a counter surface, such as a portion of a heat-setting apparatus, to mitigate relative movement of individual meltspun fibers during the HSO, (b) subjecting the precursor nonwoven web to an elevated temperature sufficient to increase a tackiness of (1) the second group of monocomponent fibers or (2) the second component of bicomponent fibers having the second onset of melting temperature or (3) the second lower melting point component of the second group of bicomponent fibers to provide an intermediate nonwoven fabric, and (c) subjecting the precursor nonwoven web to a cooling step prior to exiting the heat-setting nip;

(iii) removing the intermediate nonwoven fabric from the HSO, wherein the intermediate nonwoven fabric has an average post-heat-setting CD width and/or an average post-heat-setting basis weight; and

CLEAN CLAIMS

(iv) consolidating the intermediate nonwoven fabric to provide that nonwoven fabric having an average final CD width and/or an average final basis weight.

2. The process of claim 1, wherein (i) the elevated temperature is not within about 7°C below the second onset of melting temperature or the second lower melting point component of the second group of bicomponent fibers, such as within about any of the following: 6°C, 5°C, 4°C, 3°C, and 2°C below the second onset of melting temperature second lower melting point component of the second group of bicomponent fibers, and/or (ii) subjecting the precursor nonwoven web to the elevated temperature comprises a residence time from about 3 seconds to about 120 seconds, such as at least about any of the following: 3, 5, 8, 10, 15, 20, 30, 40, 50, and 60 seconds, and/or at most about any of the following: 120, 100, 90, 80, 70, and 60 seconds.

3. The process of claim 1, wherein the cooling step that reduces the temperature of the precursor nonwoven web to about 20°C to about 40°C prior to exiting the heat-setting nip, such as at least about any of the following: 20, 22, 25, 28, and 30°C, and/or at most about any of the following: 40, 38, 35, 32, and 30°C.

4. The process of claim 1, wherein the HSO comprises a rotating drum, wherein the heat-setting nip is defined by the rotating drum and the moving collection belt, and wherein the heat-setting nip defines a travelling path of the precursor nonwoven web extending around about 180° to about 340° of the rotating drum, such as at least about any of the following: 180, 190, 200, 210, 220, 230, 240, 250, 260, and 270° of the rotating drum, and/or at most about any of the following: 340, 330, 320, 310, 300, 290, 280, and 270° of the rotating drum.

5. The processes of claim 4, wherein the rotating drum comprises a heating portion and a cooling portion, wherein the precursor nonwoven web is conveyed past the heating portion prior to being conveyed past the cooling portion, and wherein the heating portion comprises from about 70 to about 95% of the travelling path, such as at least about any of the following:

CLEAN CLAIMS

70, 75, 80, and 85%, and/or at most about any of the following: 95, 90, and 85%, and the cooling portion comprises from about 5 to about 30% of the travelling path, such as at least about any of the following: 5, 10, and 15%, and/or at most about any of the following: 30, 25, 20, and 15%..

6. The process of claim 1, wherein the HSO comprises a linear through-air-bonding unit including a heating portion and a cooling portion, wherein the heat-setting nip defines a travelling path of the precursor nonwoven web between the linear through-air-bonding unit and the moving collection belt, and wherein the precursor nonwoven web is conveyed past the heating portion prior to being conveyed past the cooling portion, and wherein the heating portion comprises from about 70 to about 95% of the travelling path, such as at least about any of the following: 70, 75, 80, and 85%, and/or at most about any of the following: 95, 90, and 85%, and the cooling portion comprises from about 5 to about 30% of the travelling path, such as at least about any of the following: 5, 10, and 15%, and/or at most about any of the following: 30, 25, 20, and 15%.

7. The process of claim 1, wherein consolidating the intermediate nonwoven fabric comprises a thermal calendering operation, a through-air-bonding operation, an ultrasonic bonding operation, a thermal area bonded operation, a chemical bonding operation, or any combination thereof; wherein the first plurality of interlaid individual meltspun are subjected to an elevated temperature equal to or greater than the second onset of melting temperature or melting point associated with the second higher melting point component of the second group of bicomponent fibers, and optionally wherein the elevated temperature is below the first onset of melting temperature or melting point associated with the first higher melting point component of the first group of bicomponent fibers.

8. The process of claim 7, wherein the consolidating the intermediate nonwoven fabric comprises a thermal calendering operation imparts a plurality of discrete bond sites defining a bond area, wherein the bond area may comprise from about 3 to about 30%.

CLEAN CLAIMS

9. The process of claim 1, wherein (i) the average post-heat-setting CD width is at least about 95% of the average initial CD width, and/or (ii) the average post-heat-setting basis weight is at least about 95% of the average initial basis weight.

10. The process of claim 1, wherein (i) the average final CD width is at least about 95% of the average post-heat-setting CD width, and/or (ii) the average final basis weight is at least about 95% of the average post-heat-setting basis weight .

11. The process of claim 1, wherein (i) the average final CD width is at least about 95% of the average initial CD width, and/or (ii) the average final basis weight is at least about 95% of the average initial basis weight.

12. The process of claim 1, wherein the first plurality of individual meltspun fibers include the combination of the first group of monocomponent fibers or the first group of bicomponent fibers having the first onset of melting temperature and the second group of monocomponent fibers or the first group of bicomponent fibers having the second onset of melting temperature that is lower than the first onset of melting temperature, and wherein the first group of monocomponent fibers or the first group of bicomponent fibers define at least one first region, and the second group of monocomponent fibers or the first group of bicomponent fibers define at least one second region, and wherein first plurality of individual meltspun fibers are formed from a single polymeric composition.

13. The process of claim 12, wherein the second group of monocomponent fibers or the second lower melting point component of the second group of bicomponent fibers is deformed from an initially spun cross-section and fused with the first group of monocomponent fibers or the second group of bicomponent fibers during consolidating the intermediate nonwoven fabric.

CLEAN CLAIMS

14. A method of forming a composite, comprising:
- (i) forming a nonwoven fabric according to claim 1; and
 - (ii) bonding a film layer to the nonwoven fabric.
15. The method of claim 14, wherein the film layer is a single layer film or a multi-layer film, and wherein the film layer is melt extruded directly onto the nonwoven fabric or adhesively bonded to the nonwoven fabric via an adhesive layer .

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