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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C09J 5/08, 123/02, 175/00	A3	(11) International Publication Number: WO 97/47681 (43) International Publication Date: 18 December 1997 (18.12.97)
(21) International Application Number: PCT/US96/10107 (22) International Filing Date: 10 June 1996 (10.06.96) (60) Parent Application or Grant (63) Related by Continuation US 08/356,100 (CIP) Filed on 15 December 1994 (15.12.94) (71) Applicant (for all designated States except US): NORTON PERFORMANCE PLASTICS CORPORATION [US/US]; 150 Dey Road, Wayne, NJ 07470 (US). (71)(72) Applicant and Inventor: LADANG, Michel [BE/BE]; Maison du Bois 25, B-4651 Herve (BE). (72) Inventor; and (75) Inventor/Applicant (for US only): PETIT, Dominique [BE/BE]; Rue de Housse 60, B-4671 Housse (BE). (74) Agents: PORTER, Mary, E. et al.; Saint-Gobain Corporation, 1 New Bond Street, Box Number 15138, Worcester, MA 01615-0138 (US).		(81) Designated States: JP, KR, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 6 August 1998 (06.08.98)
(54) Title: PRESSURE SENSITIVE FOAM ADHESIVES (57) Abstract The present invention relates to a pressure sensitive adhesive foam with a percentage of theoretical density less than 90, wherein the foam has a peel adhesion of greater than about 1 N/cm and a compression set under constant deflection of less than about 60 %. The present invention further includes a pressure sensitive adhesive foam comprising a thermoplastic block copolymer; a tackifying resin; an isocyanate terminated monomer or oligomer; a polymer comprising a backbone selected from the group consisting of polybutadiene, polyester and polyether, wherein the polymer contains at least 2 active hydrogens capable of reacting with the isocyanate terminated monomer; and expandable particulate materials. The present invention further includes a pressure sensitive adhesive foam comprising a thermoplastic olefin polymer or copolymer, having a density less than 0,91 g/cm ³ and a torsion modulus less than 18 MPa, and a tackifying resin; and, optionally, plasticizing oil and expandable particulate materials, or glass microspheres. The invention finally further comprises a method of forming the above film.		

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 96/10107

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C09J5/08 C09J123/02 C09J175/00

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)

IPC 6 C09J

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 855 170 A (DARVELL WAYNE K ET AL) 8 August 1989 see examples 56,57	1-4
X	see example 8	6,7
X	WO 95 25774 A (MINNESOTA MINING & MFG) 28 September 1995 see claim 10	1-5
X	DATABASE WPI Section Ch, Week 9519 Derwent Publications Ltd., London, GB; Class A81, AN 95-145074 XP002009441 & JP 07 070 520 A (NICHIBAN KK) , 14 March 1995	1
X	see abstract	6,7

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *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 documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

16 January 1997

Date of mailing of the international search report

07.02.1997

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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.
X	PATENT ABSTRACTS OF JAPAN vol. 006, no. 235 (C-136), 20 November 1982 & JP 57 137375 A (SEKISUI KAGAKU KOGYO KK), 24 August 1982, see abstract ---	1
X	DATABASE WPI Section Ch, Week 8441 Derwent Publications Ltd., London, GB; Class A81, AN 84-254572 XP002009442 & JP 59 155 479 A (NITTO ELECTRIC IND KK) , 4 September 1984 see abstract ---	1,6,7
E	EP 0 717 091 A (NORTON PERFORMANCE PLASTICS CO) 19 June 1996 see claims; examples ---	1-35
X	FR 2 237 945 A (ADHESIVE TAPES LTD) 14 February 1975 see claim 1 ---	1
X	CHEMICAL ABSTRACTS, vol. 120, no. 26, 27 June 1994 Columbus, Ohio, US; abstract no. 325387, "peelable pressure sensitive tapes" XP002009440 see abstract & JP 06 033 025 A (NITTO DENKO KK) 8 February 1994 ---	1
X	US 5 024 880 A (VEASLEY GEORGE F ET AL) 18 June 1991 see column 10; claims 1-12; table 2 X see column 10, line 47 - line 50 ---	1 6,7
X	EP 0 084 220 A (MINNESOTA MINING & MFG) 27 July 1983 see page 8; claim 1; table II X see examples 25,26 ---	1 25
X	US 5 342 858 A (LITCHHOLT JOHN J ET AL) 30 August 1994 see claims; examples ---	1
X	US 4 223 067 A (LEVENS DENNIS L) 16 September 1980 see claims X see examples 2,3 ---	1 25
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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.
X	GB 2 250 513 A (NITTO DENKO CORP) 10 June 1992 see claim 1	1
X	see page 4, line 11 - line 25; examples ---	6,7
X	JP 63 202 680 A (AISIN CHEM CO LTD;OTHERS: 01) 22 August 1988 see claims; figures -----	25-30,34

INTERNATIONAL SEARCH REPORT

International application No.

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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-5, 18-24, 34-35, 40-43 : Foam characterised by foam density
2. Claims 6-17, 25-33, 44-45 : Foam characterised by expandable particulate material
3. Claims 36-39, 46-47 : Foam characterised by monoexpandable glass spheres

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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