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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) **Date of publication of the international search report:**

18 February 2016

(54) **Title:** ETHYLENE-BASED POLYMER COMPOSITION FOR FILMS WITH IMPROVED TOUGHNESS

(57) **Abstract:** The invention provides a composition comprising a first composition, comprising at least one ethylene-based polymer, and wherein the first composition comprises a MWCDI value greater than 0.9, and a melt index ratio I10/I2 that meets the following equation: $I10/I2 \geq 7.0 - 1.2 \times \log(I2)$. The invention also provides a process to form a composition comprising at least two ethylene-based polymers, said process comprising the following: polymerizing ethylene, and optionally at least one comonomer, in solution, in the presence of a catalyst system comprising a metal-ligand complex of Structure I, as described herein, to form a first ethylene-based polymer; and polymerizing ethylene, and optionally at least one comonomer, in the presence of a catalyst system comprising a Ziegler/Natta catalyst, to form a second ethylene-based polymer.



INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. B32B27/06 B32B27/32 C08F210/16 C08F4/64 C08L23/08
ADD.

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)
B32B C08F C08L

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2014/058639 A1 (DOW GLOBAL TECHNOLOGIES LLC [US]) 17 April 2014 (2014-04-17) cited in the application examples cpc2, ipc5; tables 1a, 1b -----	1-12
X	WO 2012/061168 A1 (DOW GLOBAL TECHNOLOGIES LLC [US]; DEMIRORS MEHMET [US]; CONG RONGJUAN) 10 May 2012 (2012-05-10) examples C, D; table 1 -----	1-12
X	US 2013/046061 A1 (HERMEL-DAVIDOCK THERESA J [US] ET AL) 21 February 2013 (2013-02-21) example Inv.Ex4; tables 3-5 ----- -/-	1-12



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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

"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

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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,P	WO 2014/100889 A1 (NOVA CHEM INT SA [CH]; LAM PATRICK [CA]; KER VICTORIA [CA]; GRABOW KAR) 3 July 2014 (2014-07-03) page 12; figure 3; table 2 -----	1-12
X	WO 98/26000 A1 (DOW CHEMICAL CO [US]; DUN JOZEF J VAN [BE]; DEGROOT JACQUELYN A [US];) 18 June 1998 (1998-06-18) examples 3,4; table 2a -----	1-12
X,P	EP 2 752 509 A1 (DOW GLOBAL TECHNOLOGIES LLC [US]) 9 July 2014 (2014-07-09) example comp.ex.2; tables 2-5 -----	1-12
X	WO 2013/052636 A1 (DOW GLOBAL TECHNOLOGIES LLC [US]) 11 April 2013 (2013-04-11) examples Inv.Ex.2,3,5; table 1 -----	1-12

INTERNATIONAL SEARCH REPORT

International application No.
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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 No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional sheet

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 fees, this Authority did not invite payment of additional fees.
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.:

1-12

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/037869

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/037869

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		WO 2013052636 A1	11-04-2013
		WO 2013052638 A1	11-04-2013

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12

A composition according to claim 1 and article made thereof

2. claims: 13-15

A process according to claim 13 and composition made therefrom
