

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 February 2009 (12.02.2009)

PCT

(10) International Publication Number
WO 2009/021050 A3

(51) International Patent Classification:

C08L 23/00 (2006.01) *H01B 3/44* (2006.01)
C08K 3/22 (2006.01) *H01B 9/00* (2006.01)

(21) International Application Number:

PCT/US2008/072351

(22) International Filing Date: 6 August 2008 (06.08.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/935,309 6 August 2007 (06.08.2007) US
61/018,625 2 January 2008 (02.01.2008) US

(71) Applicant (for all designated States except US): **GENERAL CABLE TECHNOLOGIES, CORP.** [US/US]; 4 Tennesseer Drive, Highland Heights, KY 41076 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **EASTER, Mark, R.** [US/US]; 4020 North Pennsylvania Street, Indianapolis, IN 46205 (US).

(74) Agents: **GREENBAUM, Michael, C.** et al.; BLANK ROME LLP, 600 New Hampshire Avenue NW, Washington, DC 20037 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
23 April 2009

(54) Title: TREE RESISTANT INSULATION COMPOSITIONS

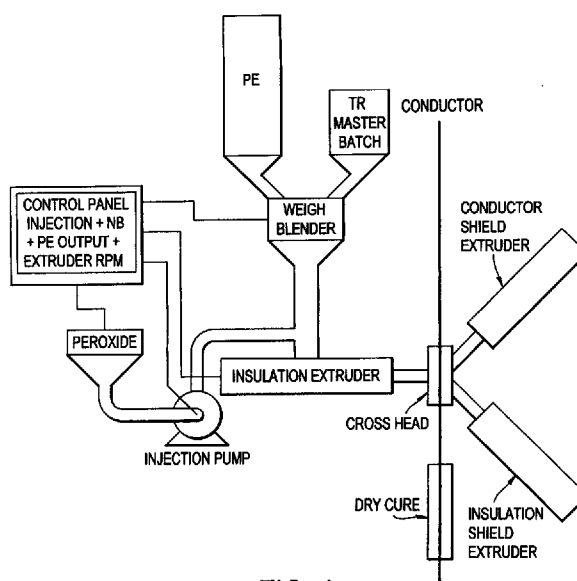


FIG. 1

(57) Abstract: Insulation compositions for electric power cables having a polyolefin base polymer and an additive comprising either low molecular weight wax or polyethylene glycol (PEG) and optionally further comprising one or more hindered amine light stabilizers, amine antioxidants and other antioxidant blends are disclosed. Also disclosed are insulation compositions comprising a C2 to C8 alpha olefin in combination with a polyethylene homopolymer together with, optionally, one or more hindered amine light stabilizer and a liquid cresol antioxidant.

WO 2009/021050 A3

A. CLASSIFICATION OF SUBJECT MATTER*C08L 23/00(2006.01)i, C08K 3/22(2006.01)i, H01B 3/44(2006.01)i, H01B 9/00(2006.01)i*

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 8 : C08L 23/00, C08K 3/22

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)

eKIPASS(KIPO internal) & keywords: insulation, cable or wire, polyolefin, PEG or wax

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	KR 10-0727207 B1 (LG CHEM. LTD.) 13 June 2007 See the abstract, page 2 lines 5-9, page line 20 to page 7 line 41, Table 2; and the claims.	11-13,30,32,39 1-10,31,33,34,36-38, 40,41,43-47
X Y	KR 10-0718022 B1 (HANWHA CHEMICAL CORPORATION) 14 May 2007 See the abstract, page 2 lines 7-21, page 3 line 9 to page 5 line 20, Table 1; and the claims.	11-13,30,32,39 1-10,31,33,34,36-38, 40,41,43-47
X Y	US 6,063,845 A (Perry Nylander) 16 May 2000 See the abstract, column 1 lines 11 to 40, column 2 lines 39 to 46, column 3 line 58 to column 4 line 60, Table 1; and the claims.	11-13,30,32,39 1-10,31,33,34,36-38, 40,41,43-47
X	US 4,622,352 A (Lie K. Djiauw et al.) 11 Nov. 1986 See the abstract, column 1 lines 5 to 24, column 6 lines 1 to 48, Table 1; and the claims.	14-19,22-29,42
X	US 4,622,350 A (Ronald D. Icenogle et al.) 11 Nov. 1986 See the abstract, column 1 lines 5 to 24, column 5 line 65 to column 6 line 43, Table 1, the examples; and the claims.	14-19,22-26



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 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

27 FEBRUARY 2009 (27.02.2009)

Date of mailing of the international search report

27 FEBRUARY 2009 (27.02.2009)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KIM Rahn

Telephone No. 82-42-481-5543



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/072351

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 15-331652 A (NIPPON UNICAR CO LTD) 21 Nov. 2003 See the abstract; the description paragraphs [0011],[0013],[0014],[0021] to [0023],[0028],[0029],[0041]; and the claims.	14,16,19-30,35,42
X	KR 10-1992-0004784 B1 (HANYANG CHEMICAL CO.) 15 June 1992 See the page 2 lines 31 to 48, page 3 lines 15 to 19; and the claims.	14,16,19-30,35,42
Y	WO 2006/114283 A1 (CHEMTURA EUROPE GMBH) 02 Nov. 2006 See the abstract; and the claims.	1-10,31,33,34,36-38,40, 41,43-47
Y	JP 15-082172 A (FURUKAWA ELECTRIC CO LTD) 19 March 2003 See the abstract; the description paragraphs [0017],[0018],[0022],[0023],[0024],[0039],[0052],[0058],[0061],[0063]; and the claims.	1-10,31,33,34,36-38,40, 41,43-47

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/072351**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:

Claims 1-10,36-38,40,41,43,44,46,47 (Group I), claim 11 (Group II), claims 12,13,39 (Group III), claims 14-26 (Group IV), claim 27-29,42 (Group V), claims 30-35 (Group VI), claim 45 (Group VII) are directed to an insulation composition for an electric cable and/or a process for making an electric cable having an insulation composition.

The only common technical feature between Group I to Group VII is: an insulation composition for an electric cable composition comprising a base polymer comprising polyolefin and/or a process for making thereof.

However this feature lacks novelty and/or inventive step with respect to the documents cited in this ISR. Thus there is no technical relationship left over the prior art among the claimed inventions, leaving the claims without a single general inventive concept. Hence there is lack of unity "a posteriori" (PCT Rules 13.1 and 13.2).

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 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/US2008/072351

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-0727207 B1	13.06.2007	CA 2596750 A1	24.08.2007
		CN 101146859	19.03.2008
		EP 1848768 A1	31.10.2007
		US 7452933	18.11.2008
		US 2007-203278 A1	30.08.2007
		WO 2007-097511 A1	30.08.2007
KR 10-0718022 B1	14.05.2007	TW 200804487 A	16.01.2008
		WO 2007-123331 A1	01.11.2007
US 6063845 A	16.05.2000	AT 361533 T	15.05.2007
		AU 1795699 A	05.07.1999
		AU 1999-17956 A1	05.07.1999
		AU 1999-17956 B2	05.07.1999
		AU 731170 B2	22.03.2001
		BR 9813578 A	10.10.2000
		CN 1119822 C	27.08.2003
		CN 1282447 A	31.01.2001
		DE 69837723 D1	14.06.2007
		EP 1042762 A1	11.10.2000
		EP 1042762 B1	02.05.2007
		KR 10-2001-0052123	25.06.2001
		SE 513079 C2	03.07.2000
		SE 9704648 D0	15.12.1997
		SE 9704648 A	16.06.1999
		SE 9704648 L	16.06.1999
		TW 557452 B	11.10.2003
		TW 557452 A	11.10.2003
		WO 99-31675 A1	24.06.1999
US 4622352 A	11.11.1986	BR 8605782 A	25.08.1987
		CA 1307864 C	22.09.1992
		DE 3688454 D1	24.06.1993
		DE 3688454 T2	30.09.1993
		EP 0227139 A2	01.07.1987
		EP 0227139 B1	19.05.1993
		EP 0427352 A1	15.05.1991
		EP 0227139 A2	01.07.1987
		EP 0227139 A3	09.11.1988
		EP 0227139 B1	19.05.1993
		FI 864793 D0	25.11.1986
		FI 864793 A	28.05.1987
		JP 62-131052 A	13.06.1987
		NO 172055 B	22.02.1993
		NO 172055 C	02.06.1993
		NO 864720 D0	25.11.1986
		NZ 218397 A	28.06.1989

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2008/072351

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4622350 A	11.11.1986	BR 8605782 A	25.08.1987
		CA 1307864 C	22.09.1992
		DE 3688454 D1	24.06.1993
		DE 3688454 T2	30.09.1993
		EP 0227139 A2	01.07.1987
		EP 0227139 B1	19.05.1993
		EP 0427352 A1	15.05.1991
		EP 0227139 A3	09.11.1988
		EP 0427352 A1	15.05.1991
		FI 864793 D0	25.11.1986
		FI 864793 A	28.05.1987
		JP 62-131052 A	13.06.1987
		KR 10-1987-0006095	09.07.1987
		NO 172055 B	22.02.1993
		NO 172055 C	02.06.1993
		NO 864720 D0	25.11.1986
		NZ 218397 A	28.06.1989
JP 15-331652 A	21.11.2003	None	
KR 10-1992-0004784 B1	15.06.1992	None	
WO 2006-114283 A1	02.11.2006	CN 101142264	12.03.2008
		EP 1885783 A1	13.02.2008
		GB 0508350 D0	01.06.2005
		JP 2008-539288	13.11.2008
		KR 10-2008-0011160	31.01.2008
		TW 200706583 A	16.02.2007
JP 15-082172 A	19.03.2003	None	