

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 May 2010 (20.05.2010)

PCT

(10) International Publication Number
WO 2010/056449 A3

(51) International Patent Classification:

C10M 105/44 (2006.01) C10N 30/06 (2006.01)
C10M 171/00 (2006.01) C10N 40/30 (2006.01)
C10N 20/02 (2006.01)

(21) International Application Number:

PCT/US2009/060451

(22) International Filing Date:

13 October 2009 (13.10.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/114,196 13 November 2008 (13.11.2008) US
12/575,725 8 October 2009 (08.10.2009) US

(71) Applicant (for all designated States except US): CHEM-TURA CORPORATION [US/US]; 199 Benson Road, Middlebury, CT 06749 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): HESSELL, Ed [US/US]; 52 Papurah Road, Fairfield, CT 06825 (US). KELLEY, Richard [US/US]; 36 Lavender Drive, Princeton, NJ 08540 (US). CARR, Dale [US/US]; 54 Wetmore Avenue, Morristown, NJ 07960 (US). HUTTER, Jeffrey [US/US]; 71 Overbrook Avenue, Edison, NJ 08817 (US).

(74) Agent: SHER, Jaimes; Chemtura Corporation, 199 Benson Road, Middlebury, CT 06749 (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, CL, 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, PE, 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, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- 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:

7 April 2011

(54) Title: LUBRICANTS FOR REFRIGERATION SYSTEMS

(57) Abstract: A polyol ester suitable for use as a lubricant or a lubricant base stock has a kinematic viscosity at 40°C less than or equal to 22 cSt and a viscosity index of greater than or equal to 140. The ester comprises a reaction product of (a) at least one polyhydric alcohol having at least 2 primary hydroxyl groups, (b) at least one monocarboxylic acid having 2 to 15 carbon atoms and (c) at least one polycarboxylic acid having 2 to 15 carbon atoms, wherein the number of acid groups derived from the polycarboxylic acid(s) is at least 25 % of the total number of acid groups derived from the monocarboxylic and polycarboxylic acids.



WO 2010/056449 A3

INTERNATIONAL SEARCH REPORT

International application No PCT/US2009/060451

A. CLASSIFICATION OF SUBJECT MATTER
 INV. C10M105/44 C10M171/00
 ADD. C10N20/02 C10N30/06 C10N40/30

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)
 C10M

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)

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	DATABASE WPI Week 200474 Thomson Scientific, London, GB; AN 2004-757748 XP002574342, & WO 2004/087847 A1 (NEW JAPAN CHEM CO LTD) 14 October 2004 (2004-10-14) * abstract -----	1-9, 13-15
X	US 5 096 606 A (HAGIHARA TOSHIYA [JP] ET AL) 17 March 1992 (1992-03-17) claim 1; table 1 -----	1-18
X	EP 0 406 479 A1 (KYOSEKI SEIHIN GIJUTSU KENK [JP] JAPAN ENERGY CORP [JP]) 9 January 1991 (1991-01-09) claims 1,2; table 1 ----- -/--	1-18

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 document 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

25 January 2011

Date of mailing of the international search report

14/02/2011

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Bertrand, Samuel

INTERNATIONAL SEARCH REPORT

International application No PCT/US2009/060451

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98/46706 A1 (NESTE OY [FI]; KOISTINEN JARI [FI]; RISSANEN KARI [FI]; SILVENNOINEN L) 22 October 1998 (1998-10-22) page 5, lines 8-11,32-34; claim 1; table 4 -----	5-18
X	JP 6 041559 A (NIPPON OILS & FATS CO LTD) 15 February 1994 (1994-02-15) * abstract -----	5-18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/060451

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.:

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/US2009/060451

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004087847	A1	14-10-2004	NONE

US 5096606	A	17-03-1992	DE 69002209 D1 19-08-1993
			DE 69002209 T2 28-10-1993
			EP 0415778 A1 06-03-1991
			ES 2042218 T3 01-12-1993
			JP 2801703 B2 21-09-1998
			JP 3179091 A 05-08-1991

EP 0406479	A1	09-01-1991	DE 68914448 D1 11-05-1994
			DE 68914448 T2 25-08-1994
			DE 68925537 D1 07-03-1996
			DE 68925537 T2 04-07-1996
			DE 68927916 D1 30-04-1997
			DE 68927916 T2 21-08-1997
			DE 68928281 D1 02-10-1997
			DE 68928281 T2 15-01-1998
			ES 2051340 T3 16-06-1994
			ES 2099120 T3 16-05-1997
			ES 2104650 T3 16-10-1997
			ES 2082341 T3 16-03-1996
			SG 49157 A1 18-05-1998
			SG 49165 A1 18-05-1998

WO 9846706	A1	22-10-1998	AU 6836198 A 11-11-1998
			EP 0973853 A1 26-01-2000
			FI 980730 A 12-10-1998
			JP 2001526712 T 18-12-2001

JP 6041559	A	15-02-1994	NONE

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

1. claims: 1-4(completely); 6-18(partially)

Polyol ester having a KV40 of 22 cSt or less, a VI of 140 or greater and comprising the reaction product of a polyol (a), a monocarboxylic acid (b) and a polycarboxylic acid (c) wherein the number of acid groups derived from the polycarboxylic acid(s) is at least 25 % of the total number of acid groups derived from the monocarboxylic and polycarboxylic acids.

Lubricant blend and working fluid comprising the polyol ester

2. claims: 5(completely); 6-18(partially)

Polyol ester having a KV40 of 22 cSt or less, a VI of 140 or greater and comprising the reaction product of a polyol (a), a linear monocarboxylic acid (b), a branched monocarboxylic acid (c), and a polycarboxylic acid (d) wherein the number of acid groups derived from the polycarboxylic acid(s) is at least 25 % of the total number of acid groups derived from the monocarboxylic and polycarboxylic acids.

Lubricant blend and working fluid comprising the polyol ester
