



Industria y Comercio

S U P E R I N T E N D E N C I A

Delegatura de propiedad Industrial

División de Nuevas Creaciones

PCT
SOLICITUD

PATENTE DE INVENCION

21. EXPEDIENTE No.

06-90329

54. TÍTULO

Tintas a Barmicas Offset de Baja Hicquans,
Bajo Olor

51. CLASIFICACIÓN INTERNACIONAL

71. SOLICITANTE

Sun Chemical Corporation

DOMICILIO

New Jersey, Estados Unidos

74. APODERADO

Delia Rochryuz D'Aleuán

22. BOGOTÁ, D. C.,

Septiembre 9/06

Cesión
Fol. 12-10-2006

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE
PCT
ENTRADA EN FASE NACIONAL

1) SOLICITUD DE:			
☒ Patente de invención		☐ Patente de Modelo de Utilidad	
☒ Capítulo I.		☐ Capítulo II	
2) SOLICITANTE (71)	Nombre: Sun Chemical Corporation Dirección: 35 Waterview Boulevard Parsippany, NJ 07054, USA Nacionalidad o domicilio: New Jersey, Estados Unidos Lugar de constitución: New Jersey Estados Unidos		IDENTIFICACIÓN C.C. ☐ NIT. ☒ C.E. ☐ OTRO ☐ Cual _____ NÚMERO _____
	Teléfono: _____ Fax: _____ E. Mail: _____		
3) REPRESENTANTE O APODERADO	Nombre DILIA MARÍA RODRÍGUEZ D'ALEMAN Dirección: Carrera 11 N°. 86-53 Piso 6 Bogotá D C. Teléfono: 6181088 Fax. 6350824 E. Mail: info@clarkemodet.com.co		IDENTIFICACIÓN C.C. ☒ NIT: ☐ C.E. ☐ OTRO ☐ NÚMERO: 41.654.882 TP: 20824 CSJ
4) INVENTOR (ES) (72)	Nombre: 1. PULINA, Tillman; 2. FALKENBERG, Wolfram Dirección: 1. Im Munchsgraben 11, 61130 Nidderau-Heldenbergen Alemania; 2. Buchenweg 7, D-61118 Bad Villbel, Alemania Nacionalidad o Domicilio: 1. Todos los anteriores, alemanes		
5) PCT (86) Solicitud Internacional No. PCT/US2005/008504 Fecha: Marzo 14, 2005 Publicación Internacional No. WO 2005/090498 A1 Fecha: Sept. 29, 2005			
6) Título (54) TINTAS O BARNICES OFFSET DE BAJA MIGRACIÓN, BAJO OLOR			
7) Clasificación Internacional: C09D 11/02, B41M 1/06			
8) PRIORIDAD		33) País de Origen	(32) Fecha
SI ☒ NO ☐		Gran Bretaña	Marzo 12, 2004
9) Comprobante de pago N°. Fecha:			
Instrucciones para el diligenciamiento del presente formulario Ver reverso de esta pagina			



2

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
Rad: 06-090329-00000-0000
Fee 2006-09-08 15 52 11 Dep 2020 MUECREACIONES
Tra 11 PATENTEIYII
Eve 372 FASENACIONALI
Act 411 PRESENTACION Folios 77

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 900176089-2

RECIBO OFICIAL DE CAJA : 06 - 61,910
SEMA : AGOSTO 14 DE 2006

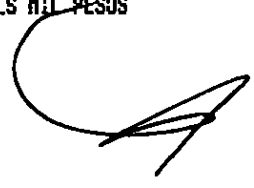
***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CLARKE NOBET Y CO. COLOMB	CONSIGNACION	BANCO POPULAR	050-00110-6	53268911	14/08/2006	7,394,000.00

***** CONCEPTO *****

RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	463,000.00
	TOTAL :	\$ 463,000.00

SON: CUATROCIENTOS SESENTA Y TRES MIL PESOS



2835

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

10)

ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud
- ☐ Comprobante de pago por reivindicación de prioridad
- ☒ Documento que acredita la existencia y representación legal cuando el solicitante sea persona Jurídica
- ☒ Poderes, si fuera el caso
- ☐ Documento de cesión del inventor al solicitante o a su causante
- ☐ Declaraciones
- ☒ Copia de la solicitud Internacional (Resumen, descripción, reivindicación, Dibujos)
- ☒ Traducción de la solicitud internacional al castellano (Resumen, descripción, reivindicación, Dibujos)
- ☐ Copia del examen preliminar efectuado por la IPEA
- ☐ De ser el caso, copia del contrato de acceso
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas
- ☐ De ser el caso, certificado de depósito del material biológico
- ☐ Arte final 12 x 12 y 6 x 6 cm
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionados parcial o totalmente con la invención de esta solicitud
- ☒ Otros
 - 1. Reporte de Búsqueda
 - 2. Opinión escrita

11) FIGURA CARACTERÍSTICA:

12) Solicitud concesión de la patente,

NOMBRE: DILIA RODRÍGUEZ D'ALEMAN

FIRMA:

C.C. 41.654.882 de Bogotá TP 20824 CSJ

Instrucciones para el diligenciamiento del presente formulario. Ver reverso de esta pagina

①
P. 288 P. 652.

4

TRADUCCIÓN OFICIAL No. 01/074 de un documento escrito en inglés, el cual para su identificación se sella con el sello del traductor al tiempo con la presente. Esta traducción ha sido preparada por Juan Pablo Piedrahita Aguilera, Traductor e Intérprete Oficial debidamente reconocido de conformidad con el Certificado de Idoneidad Profesional No 0045 expedido por la Universidad Nacional de Colombia

(Se traduce un Certificado de Notarial, Legalización y Apostilla escritos en inglés, adjuntos a un poder otorgado por la compañía SUN CHEMICAL CORPORATION, escrito en inglés y español, con fecha Febrero 13, 2001.)

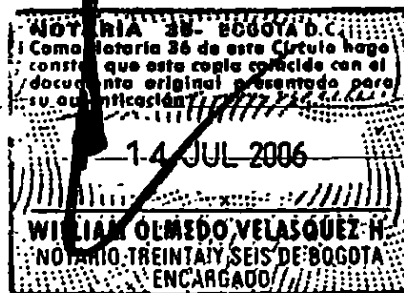
CERTIFICADO NOTARIAL (Cuando el Solicitante es una Sociedad)

(Poderes otorgados en El Salvador, México, Estados Unidos de América y Venezuela)

Expedido hoy 13 de Febrero, 2001 el suscrito Notario CERTIFICA que:

- 1) Melvin M. Cox (nombre de la persona que firma el poder), mayor de edad y domiciliada en Fort Lee, New Jersey, suscribió el anterior documento.
- 2) El otorgante le es conocido personalmente y tiene facultad legal para firmar el documento
- 3) El otorgante ha suscrito el anterior documento en su calidad de Vicepresidente de la persona jurídica Sun Chemical Corporation.

TRADUCCION OFICIAL No. 01/074
JUAN PABLO PIEDRAHITA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
C. IDONEIDAD 045
UNIVERSIDAD NACIONAL DE COLOMBIA



4) La mencionada persona jurídica con domicilio comercial en 222 Bridge Plaza South, Fort Lee, New Jersey, está debidamente constituida, tiene actualmente existencia legal y el fin para el cual se otorga este poder se encuentra dentro de su objeto social.

5) El otorgante tiene en efecto la idoneidad referida y su representación es legal y está autorizado para otorgar este poder

6) Fundamento las certificaciones 3), 4) y 5) en los documentos auténticos que para tal fin me fueron exhibidos.

(Firmado) Elizabeth C Reyes

Notario Público

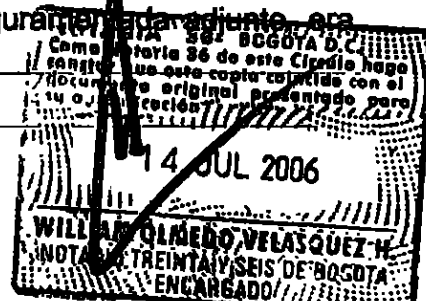
(Sello Notarial a Tinta. S Elizabeth C. Reyes, Notario Público para New Jersey, Mi Comisión Expira Febrero 13, 2002)

(Sello Notarial Redondo en Relieve)

Nota: El Consulado de Colombia debe autenticar la firma del notario público

ESTADO DE NEW JERSEY,
CONDADO DE BERGEN} ss. .

Yo, Kathleen A, Donovan, Escribano del Condado de Bergen, (el mismo siendo una Corte de Registro de dicho Condado, que tiene por ley un sello), POR EL PRESENTE CERTIFICO QUE Elizabeth C. Reyes, cuyo nombre está suscrito en el certificado de reconocimiento, prueba o declaración juramentada adjunto, era



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en el momento de recibir tal reconocimiento, prueba o declaración juramentada un NOTARIO PUBLICO debidamente comisionado, juramentado y residente en dicho Estado y como tal NOTARIO PÚBLICO, es un funcionario de dicho Estado debidamente autorizado por sus leyes para tomarlos y certificarlos, asó como para tomar y certificar las pruebas y reconocimientos de escrituras para traspasos de tierra, tenencias o herencias, y otros instrumentos por escrito, para registro en dicho Estado; y que dicho reconocimiento está debidamente firmado y tomado conforme a las leyes de dicho Estado y que estoy bien familiarizado con su caligrafía y verdaderamente creo que la firma en el certificado adjunto es su firma auténtica.

Además certifico que no se requiere por las leyes de este Estado que la impresión del sello de dicho NOTARIO PÚBLICO esté en los archivos de mi oficina.

EN TESTIMONIO DE LO CUAL firmo y estampo mi sello oficial hoy 13 de Febrero de 2001 A.D

(Firmado) Kathleen A. Donovan, Escribano
(Sello en Relieve del Condado de Bergen, NJ)

APOSTILLA

(Convención de la Haya de Octubre 5 de 1961)

- 1 País: Estados Unidos de América
Este documento público
- 2. Ha sido firmado por Kathleen A. Donovan

TRADUCCION OFICIAL No. 01/074
JUAN PABLO PIEDRAHITA AGUIJERA
TRADUCTOR E INTERPRETE OFICIAL
C IDONEIDAD 045
UNIVERSIDAD NACIONAL DE COLOMBIA



3. Actuando en calidad de Escribano del Condado
4. Lleva el sello/estampilla de Condado de Bergen

CERTIFICADO

5. En Trenton, New Jersey 6. Hoy 21 da Febrero, 2001
7. Por Peter R Lawrence, Tesorero de New Jersey
8. Certificado Número A128014
9. (SELLO)

(Sello Redondo de Oblea en Relieve)

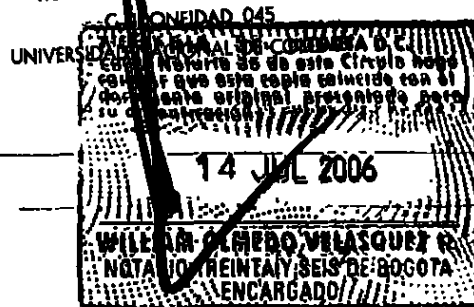
10. Firma: (Firmado) Peter R Lawrence

Certificado de Apostilla No. A128014 por el Tesorero de New Jersey, de fecha
Febrero 21, 2001.

ES TRADUCCIÓN FIEL Y COMPLETA de la cual se deja copia en los archivos de
esta oficina para su confrontación y a la cual me remito.

Bogotá, Marzo 8 de 2001.

TRADUCCION OFICIAL No. 01/C79
JUAN PABLO PIEDRAHITA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL



MINISTERIO DE
RELACIONES EXTERIORES

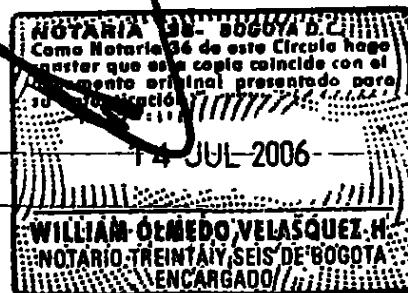
245262
Juan P. C. S. H. H. H.

CUYA FIRMA APARECE EN EL
DOCUMENTO DESEMPEÑA
LAS FUNCIONES INDICADAS

NO SE ASUME
RESPONSABILIDAD DEL TEXTO

2004 JUL 28 A 11: 54

UES
JEFE DE LEGALIZACIONES
C. 3001A D.C.



P400

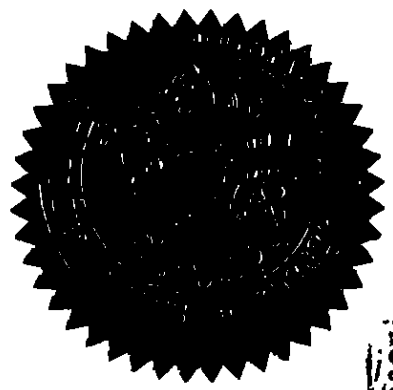
APOSTILLE

(CONVENTION DE LA HAYE DU 5 OCTOBRE 1961)

- 1. COUNTRY: UNITED STATES OF AMERICA
- 2. THIS PUBLIC DOCUMENT HAS BEEN SIGNED BY:
KATHLEEN A DONOVAN
- 3. ACTING IN THE CAPACITY OF:
COUNTY CLERK
- 4. BEARS THE SEAL/STAMP OF:
COUNTY OF BERGEN

CERTIFIED

- 5. AT TRENTON, NEW JERSEY
- 6. THE 21ST DAY OF FEBRUARY 2001
- 7. BY: Peter R Lawrance, NEW JERSEY TREASURER
- 8. NO. A128014
- 9. SEAL/STAMP:
- 10. SIGNATURE



Peter R Lawrance

TRADUCCION OFICIAL No C1/674
NOTARIA 38- 8014111-0001 DRAHITA AGUILERA
Como Notaria 36 de este Circulo hago
constar que esta copia colada con el original
documento original presentado para
su autenticación
14 JUL 2006
UNIVERSIDAD NACIONAL DE COLOMBIA

Clarke, Modet & Co. Colombia Ltda.

PROPIEDAD INDUSTRIAL y DERECHOS DE AUTOR

Apertado Acreo 92397
Santafé de Bogotá, Colombia

PODER

Yo (nosotros), abajo firmante(s)

Melvin M Cox

en mi (nuestro) carácter de representante(s) legales de

Sun Chemical Corporation

una sociedad organizada y existente de acuerdo con las leyes de

Delaware

y en actual cumplimiento de su objeto social, con domicilio en

*222 Bridge Plaza South
Fort Lee NJ 07024 USA*

por el presente instrumento confiero (conferimos) poder especial a favor de DILIA MARIA RODRIGUEZ D'ALEMAN, con Cédula de Ciudadanía No. 41.654.882 de Bogotá, y tp. 20824 y CLAUDIA LUCIA CARO RAMIREZ, con Cédula de Ciudadanía No. 40.017.374 de Tunja, y tp. 36448, con domicilio en Santa Fé de Bogotá, Colombia, para que actuando en su orden en nombre del (de la) otorgante le (la) representen ante cualquier entidad, autoridad y/o persona, especialmente ante las del orden Administrativo, Contencioso Administrativo, Judicial, Tribunales de Arbitramento y/o cualquier otro en lo referente a los siguientes asuntos:

- 1) Solicitar, tramitar, obtener y/o registrar cualquiera de las modalidades de Propiedad Industrial, tales como: patentes de invención, modelos de utilidad; diseños industriales, variedades vegetales; marcas, lemas, nombres y enseñanzas comerciales y denominaciones de origen; así como sus renovaciones, prórogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias.
- 2) Solicitar, tramitar, obtener y/o registrar derechos de autor, en cualquiera de sus presentaciones así como la protección de secretos industriales y know-how.
- 3) Solicitar, tramitar, obtener y/o registrar registros sanitarios, permisos y/o licencias de funcionamiento; así como sus renovaciones o prórogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias.
- 4) Ejercer acciones de oposición, observación, reclamos, reconsideración, reposición, apelación, cancelación administrativa o judicial, nulidad, protección al consumidor, concesión de licencias, protección de secretos industriales y demás acciones y recursos relacionados con derechos derivados de los asuntos arriba indicados y en contra de la competencia desleal, acciones derivadas de la obtención o explotación de licencias, acciones de indemnización de perjuicios. También podrá(n) intervenir en juicios civiles, comerciales, penales, contencioso-administrativos, tutelas y de policía, en acciones o juicios promovidos por el (la) mandante o en contra el (ella).
- 5) Registrar nombres de dominio ante la entidad competente.
- 6) En el ejercicio de este mandato los mandatarios arriba mencionados quedan facultados para: conciliar, cancelar, transigir, comprometer en árbitros, desistir, recibir y tomar posesión de la cosa objeto de litigio y renunciar o desistir a derechos concedidos o en curso de concesión, admitir los hechos del proceso.
- 7) Ratificar o no la agencia oficiosa.
- 8) Así mismo faculto (facultamos) a los mencionados apoderados para recibir notificaciones y designar apoderados judiciales o extrajudiciales, sustituir el presente poder y revocar las sustituciones que hicieren.

Dado y firmado en *Fort Lee NJ USA*

a los *13* días de *Febr* de *2001*

Melvin M. Cox

Firma / Signature

By: Melvin M. Cox, Vice President, Sun Chemical

POWER OF ATTORNEY

I (we), the undersigned

Melvin M. Cox

legal representative(s) of

Sun Chemical Corporation
existing under the laws of

Delaware

and in present execution of its business activity, domiciled at

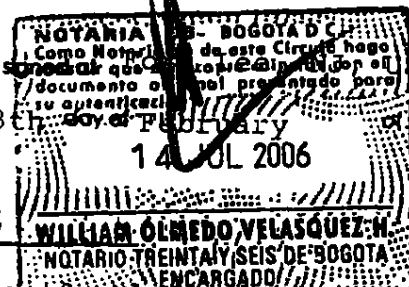
222 Bridge Plaza South
Fort Lee, NJ 07024 USA

do hereby grant POWER OF ATTORNEY to DILIA MARIA RODRIGUEZ D'ALEMAN, Identification card No. 41.654.882 of Bogotá, and tp. 20824 and CLAUDIA LUCIA CARO RAMIREZ, tp. 36448, Identification card No. 40.017.374 of Tunja, residing in Santa Fé de Bogotá, Colombia, to act in the order of their appointment in behalf of grantor before any entity, authority and/or natural or juridical person, specially before those Administrative, Administrative-Contentious, Judicial, arbitration courts, and/or any other, in all matters concerning the following:

- 1) To apply, process, obtain and/or register any of the modalities of Industrial Property, such as: Patents of Invention, Utility Models, Designs, vegetal varieties; Marks, Slogans, Trade Names and emblems and appellations of Origin; as well as their renewals, extensions, assignments, changes of name and/or domicile, agreements and licenses.
- 2) To apply, process, obtain and/or register copyrights of any kind as well as protection of industrial secrets or know-how.
- 3) To apply, process, obtain and/or register sanitary registrations, operating authorizations and/or licenses; as well as their renewals or extensions, assignments, changes of name and/or domicile, agreements and licenses.
- 4) To bring actions of opposition, observations, claims, reconsideration, appeal or legal remedies, cancellations, nullity, protection to the consumer, granting of licenses, protection of trade secrets and other actions related with rights derived from the above-mentioned matters and against the unfair competition, actions resulting from the obtaining or exploitation of licenses, recovering damages actions. They can also intervene or participate in Civil, Commercial, Criminal or Contentious-Administrative Trials, the actions for writ mandamus, police actions, in actions, lawsuits or litigations instituted by the grantor or against him.
- 5) To register domain names before the competent entity.
- 6) To the effect of this mandate the above-named proxy are empowered to: conciliate, cancel, settle, submit to arbitration, withdraw and to receive and take possession of the litigation related object and waive or renounce the rights granted or in process of granting, admit the facts of the case.
- 7) To ratify or not the officious agency.
- 8) I (we) hereby appoint the above mentioned attorneys with powers to receive notifications and to designate judicial and extrajudicial attorneys, substitute this Power of Attorney and to revoke such substitutions.

Granted and signed at *Fort Lee NJ USA*

on this *13th* day of *February* of *2001*



CERTIFICADO NOTARIAL (Cuando el solicitante es SOCIEDAD)

(Poderes otorgados en El Salvador, Estados Unidos, Mexico y Venezuela)

A los _____ días del mes de _____
de _____, el Notario que suscribe DA FE de
que

1. _____
(nombre de la persona que firma el poder)

mayor de edad y domiciliado _____
firmó de su puño
y letra el documento que antecede.

2. Conoce al (a la) otorgante y que este (a) está
legalmente capacitado para el otorgamiento.

3. El otorgante ha firmado el referido documento en
su carácter de _____
de la persona jurídica _____

4. La citada persona jurídica con sede en _____
está
legalmente constituida, que tiene actualmente
existencia legal y que el acto para el cual se ha
otorgado este poder está comprendido entre los que
constituyen su objeto social.

5. El otorgante tiene efectivamente la representación
que ostenta, que esta es legítima y que está
facultado para otorgar este poder.

6. Las anteriores certificaciones de los puntos 3, 4 y 5, me
constan porque he tenido a la vista los
documentos auténticos.

Notario Público

NOTA: A continuación de lo anterior, el Consul de
Colombia debe autenticar la firma del Notario Público.

CERTIFICADO NOTARIAL (Cuando el solicitante es INDIVIDUO)

A los _____ días del mes de _____
de _____, el Notario que suscribe DA FE de
que

1. _____
(nombre de la persona que firma el poder)

mayor de edad y domiciliado en _____
firmó en su presencia
el documento que antecede, conoce al otorgante
y que este está legalmente capacitado para el
otorgamiento.

Notario Público

NOTA: A continuación de lo anterior, el Consul de
Colombia debe autenticar la firma del Notario Público.

Para todos los demás países el Señor Consul de
Colombia ante quien se otorgue debe expedir una
certificación dejando constancia 1) de la existencia
legal de la sociedad, 2) de que esta ejerce actualmente
su objeto social, y 3) de que la persona o personas que
otorgan el poder están facultadas para hacerlo, dejando
constancia así mismo de que tuvo a la vista las pruebas
que acrediten tales circunstancias.

NOTARIAL CERTIFICATE (When the applicant is a CORPORATION)

(Powers of attorney granted in El Salvador, Mexico, U.S.A. and Venezuela)

This 13th day of February 2001,
the undersigned Notary CERTIFIES that:

1. Melvin M. Cox
(name of the person who signs the power of attorney)

of legal age and domiciled
in Fort Lee, NJ

set his hand on the foregoing document.

2. The grantor is to him personally known and that
he/she has legal capacity to execute the document.

3. The grantor has executed the foregoing document
in his capacity of Vice President

of the juridical person Sun Chemical Corporation

4. The mentioned juridical person with place of
business in 222 Bridge Plaza South, Fort Lee, NJ
is duly organized, has actual legal existence and that
the purposes for which the power of attorney is granted
are within the scope of its corporate purposes.

5. The grantor has in fact the referred quality and
that his/her representation is legal and that he/she
is empowered to grant this power of attorney.

6. I have based the above certifications 3, 4 and 5, on
the authentic documents which for such purpose were
exhibited to me.

ELIZABETH C. REYES

A Notary Public of New Jersey

My Commission Expires February 13 2002

Notary Public

NOTA: Then the Colombian Consul must legalize the
signature of the Notary Public.

NOTARIAL CERTIFICATE (When the applicant is an INDIVIDUALS)

On the _____ day of _____
the undersigned Notary CERTIFIES that:

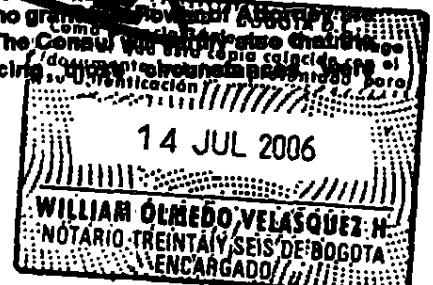
1. _____
(name of the person who signs the Power of Attorney)

of legal age and domiciled at _____
signed in his presence
the foregoing document, the grantor is to him
personally known and that he/she has legal capacity to
execute the document.

Notary Public

NOTA: Then the Colombian Consul must legalize the
signature of the Notary Public.

For all other countries the Colombian Consul or before
who it is granted must issue a certification stating 1) the
legal existence of the corporation, 2) that the corporate
purposes are actually being accomplished, 3) that the
person or persons who grant the Power of Attorney are
empowered to do it. The Consul who issues the certification
documents evidencing the above mentioned circumstances
exhibited to him.



STATE OF NEW JERSEY,
COUNTY OF BERGEN) SS.:

I, Kathleen A. Donovan, Clerk of the County of Bergen
(the same being an office of Record of the aforesaid County,
having by law a seal)

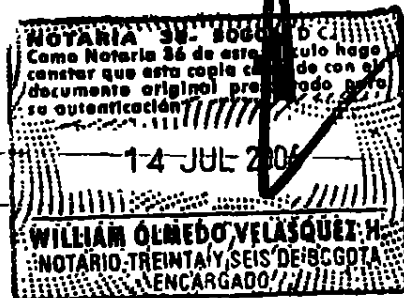
DO HEREBY CERTIFY, That Elizabeth C. Reyes
whose name is subscribed to the attached certificate of acknowledgement, proof or affidavit, was at the time of taking said
acknowledgement, proof or affidavit, a NOTARY PUBLIC, duly commissioned and sworn and residing in said State, and was,
as such NOTARY PUBLIC, an officer of said State duly authorized by the laws thereof to take and certify the same, as well as
to take and certify the proof and acknowledgement of deeds for the conveyance of land, tenements or hereditaments, and other
instruments in writing to be recorded in said State, and that the said acknowledgement is duly executed and taken according to
the laws of said State, and that I am well acquainted with his/her handwriting and verily believe the signature to the attached
certificate is his/her genuine signature

And I do further certify that the impression of the seal of such NOTARY PUBLIC is not required by the laws of this
State to be filed in my office

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal this

13 day of February A.D. 20 01
Kathleen A. Donovan Clerk
Deputy

10
TRADUCCION OFICIAL No. 01/024
JUAN PABLO PIEDRAHITA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
C. IDONEIDAD 045
UNIVERSIDAD NACIONAL DE COLOMBIA



(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 September 2005 (29.09.2005)

PCT

(10) International Publication Number
WO 2005/090498 A1

(51) International Patent Classification?: C09D 11/02, B41M 1/06

(21) International Application Number:
PCT/US2005/008504

(22) International Filing Date: 14 March 2005 (14.03 2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0405658 6 12 March 2004 (12 03 2004) GB

(71) Applicant (for all designated States except US): SUN
CHEMICAL CORPORATION [US/US], 35 Waterview
Boulevard, Parsippany, NJ 07054 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): PULINA, Tillman
[DE/DE], Im Munchsgraben 11, 61130 Nidderau-Helden-
bergen (DE) FALKENBERG, Wolfram [DE/DE];
Buchenweg 7, D-61118 Bad Vilbel (DE).

(74) Agent: PERSLEY, Sidney, 35 Waterview Boulevard, Par-
sippany, NJ 07054 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, HU, IE, IS, IT, LT, LU, MC, NL, 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

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

WO 2005/090498 A1

(54) Title: LOW MIGRATION, LOW ODOUR OFFSET INKS OR VARNISHES

(57) Abstract: An offset printing ink or varnish uses as a solvent at least one water-insoluble ester of a polycarboxylic acid with an alcohol having at least 4 carbon atoms

LOW MIGRATION, LOW ODOUR OFFSET INKS OR VARNISHES

The present invention relates to novel low migration, low odour inks useful for offset lithographic printing, especially sheetfed offset lithographic printing.

Sheetfed offset lithography is the dominant printing process for the printing of folding cartons for many purposes, including for use as food packaging. However, where an ink is to be used on food packaging, it is essential, from the point of view of customer acceptance, that it should not contaminate the food or impart any unnatural odour to it. Moreover, there is an increasing tendency for legislation to prescribe very low levels of contaminants in foods and other matter which could affect public health. Contamination, in this context, can result from migration of components of an ink into the foodstuff or other packaged material or from undesirable odours imparted to the packaged material by the ink.

There is, therefore, a need for a printing ink which can be used for sheetfed offset lithography and which allows little or no migration of its components whilst being essentially odourless or having little odour. The nature of the offset lithography process also implies severe restrictions on the ink formulation, as explained in *The Printing Ink Manual* by R.H. Leach *et al.* [Fifth edition (1993) pages 342-346], and meeting all of these requirements is not an easy task.

One of the main odorous components of offset inks is the solvent used. It is in the nature of offset lithography that the solvent must be organic and insoluble in water. Many solvents having these properties are not only highly odorous but also many of them are toxic to a greater or lesser extent. The choice of solvents for this purpose is, therefore, highly restricted.

US Patent No. 6,613,813 attempts to overcome these problems by the use, *inter alia*, of a solvent comprising an ester of a multivalent alcohol with a fatty acid. The composition can optionally contain a multifunctional allyl ester of a multivalent organic acid; however, the function of these esters is to enhance the drying process by undergoing oxidative drying, rather than to serve as a substantial part of the solvent system. Whilst the solution proposed in US Patent No. 6,613,813 is effective, the Examples of the patent seem to suggest that an additional drying agent is necessary to achieve the required drying in a reasonable time.

We have now discovered that a class of compounds based on polycarboxylic acids are useful as solvents for offset printing inks and are capable giving a number of improvements over

the known inks of US Patent No. 6,613,813, including equivalent or lower odour, equivalent or lower migration, and equivalent or improved stability on the press.

Thus, the present invention consists in an offset printing ink or varnish, particularly useful in sheetfed offset lithographic printing, characterised in that the solvent comprises at least one water-insoluble ester of a polycarboxylic acid with a monohydric alcohol having at least 4 carbon atoms.

As the oxidative drying process and the by-products generated by it are an important source of odour development in finished prints, a careful selection of raw materials is necessary. Driers as well as raw materials with oxidative drying potential as used in conventional sheetfed offset inks should preferably be excluded. Good rub resistance of the print job may be achieved by using the inks of the present invention in combination with a water based overprint varnish (OVP).

The composition of printing inks or varnishes for offset lithographic printing, including sheetfed offset lithographic printing, is very well known, and is described in considerable detail in, for example, *The Printing Ink Manual (supra)* pages 342-452, and in US Patents No 5,382,282, No. 5,725,646 and No. 6,489,375.

In general terms, a lithographic printing ink should have a low surface tension, be water-repellent, be capable of emulsifying with a fountain solution, and, for conventional sheetfed offset lithography, must be capable of drying without radiation. These very particular requirements are met by careful formulation and choice of the various components and is well known in the printing ink industry.

The solvent used in the ink or varnish composition of the present invention is a water-insoluble ester of a polycarboxylic acid with an alcohol having at least 4 carbon atoms. The polycarboxylic acid may be aromatic or aliphatic, although it is preferably aromatic, and should have more than one carboxylic acid group. Preferably, the acid has from 2 to 4, more preferably 3, carboxylic acid groups.

Examples of aromatic polycarboxylic acids include: trimellitic acid, phthalic acid, isophthalic acid, terephthalic acid, 1,2,3-benzenetricarboxylic acid, 1,2,4-benzenetricarboxylic acid, 1,3,5-benzenetricarboxylic acid, 1,2,3,4-benzenetetracarboxylic acid, 1,2,3,5-benzenetetracarboxylic acid, 1,2,4,5-benzenetetracarboxylic acid, 1,3,5-naphthalenetetracarboxylic acid, 1,3,6-naphthalenetetracarboxylic acid, 6-carboxy-1-(carboxymethyl)-2-naphthalenepropionic acid,

1,4,5,8-naphthalenetetracarboxylic acid, 3,3',4,4'-biphenyltetracarboxylic acid and 3,4,9,10-perylenetetracarboxylic acid. Of these, trimellitic acid is preferred.

Examples of aliphatic polycarboxylic acids include: dicarboxylic acids, such as oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, suberic acid, azelaic acid, sebacic acid, tartronic acid, malic acid and tartaric acid; tricarboxylic acids, such as citric acid, acetylcitric acid, 2-hydroxy-2-methylpropane-1,2,3-tricarboxylic acid, pentane-1,3,5-tricarboxylic acid, 1,2,3-propanetricarboxylic acid, and 7-methyl-1,7,9-decanetricarboxylic acid; and tetracarboxylic acids, such as 1,2,3,4-butanetetracarboxylic acid, cyclopentane-1,2,3,4-tetracarboxylic acid, 2,3,4,5-tetracarboxytetrahydrofuran, and 1,1,12,12-dodecanetetracarboxylic acid.

The monohydric alcohol with which these polycarboxylic acids form esters has at least 4 carbon atoms, and preferably from 4 to 20, more preferably from 4 to 18, and still more preferably from 6 to 10, carbon atoms. Examples of such alcohols include: butanol, sec-butanol, t-butanol, pentanol, hexanol, heptanol, octanol, nonanol, decanol, undecanol, dodecanol, tridecanol, tetradecanol, pentadecanol, hexadecanol, heptadecanol, octadecanol, nonadecanol, icosanol, hexan-2-ol, 2,3-dimethylbutan-2-ol, 3-methyl-pentan-1-ol, 3,3-dimethylbutan-2-ol, and 2,3,3-trimethylbutan-2-ol.

A particularly preferred polycarboxylic acid ester solvent in accordance with the present invention is that sold under the trade name Uraplast 525 by DSM Resins bv. This is a low viscosity trialkyl trimellitate based on C₈ – C₁₀ alcohols. It has previously been used as a plasticiser. Other suitable solvents include tridecyl trimellitate, tributyl citrate and acetyl tributyl citrate.

In order that the ester of the polycarboxylic acid and the monohydric alcohol should be able to function as a solvent, it is normally important that its molecular weight be within a specific range. In general, a molecular weight of at least 250, and more preferably at least 300, is preferred, the maximum preferred molecular weight being 1000. Thus, the molecular weight is preferably from 250 to 1000, more preferably from 300 to 1000 and still more preferably from 500 to 800.

Although the polycarboxylic acid ester may be used as the sole solvent in the compositions of the present invention, it may be necessary, in order to achieve the correct rheological properties, to include also another solvent. This other solvent, if present, preferably does not exceed 60% of the total solvent present in the composition. More preferably, from 45%

to 90%, still more preferably from 50% to 80%, and most preferably from 55% to 65%, by weight of said solvent comprises the polycarboxylic acid ester.

If another solvent is present, any solvent conventionally used in lithographic inks may be employed, provided that it has no oxidative drying potential and that it does not tend to migrate from the dried ink. Examples of such other solvents include triglycerides of C₈ - C₂₀ aliphatic carboxylic acids, for example, coconut oil, such as that sold under the trade name Kokosöl by Lechner and Crebert.

The solvent, or mixture of solvents, used in the present invention preferably has a melting point such that it is liquid at the temperature at which the printing ink or varnish is to be used. This normally means that it should be liquid at the temperature of the printing press, and preferably at ambient temperature, e.g. at temperatures above 10-15°C. In some cases, however, for example if the printing ink or varnish is to be used only in a warm atmosphere, it may be possible that the solvent is solid at these temperatures, provided that it melts at a somewhat higher temperature, for example about 25°C.

The resin component in a lithographic ink composition or varnish functions, among other things, as a film former to bind the varnish and pigment together and, when the ink or varnish dries, to bind the same to the receiving substrate. The resin component also contributes to the properties of hardness, gloss, adhesion and flexibility of an ink and must be compatible with the solvent component of the varnish. In conventional oleoresinous systems, the resin component commonly comprises a first or hard resin component and a second resin component which typically is an alkyd or polyester resin, but which can comprise various other compositions and resins as well.

Hard resins usable in the lithographic inks or varnishes of the present invention include, for example, natural or processed resins such as rosins, rosin esters, maleic modified resins, rosin modified fumaric resins, dimerised and polymerised rosins, , phenolics, rosin modified phenolics, terpenes, polyamides, cyclised rubber, acrylics, hydrocarbons and modified hydrocarbons. Also included among the available resins are those identified in *The Printing Ink Manual*, supra, the substance of which is incorporated herein by reference.

The lithographic inks of the present invention will usually include at least one pigment, the nature of which is not critical to the present invention, and which may be chosen from any of those pigments well known to those skilled in the art. Alternatively, the ink may include an extender. Varnishes will not normally include any pigment or extender in their composition.

In addition, there may, if desired, be present other additives, such as antioxidants, waxes, anti-set-off compounds, lithographic additives and rheology modifiers. These are likewise well known to those skilled in the art.

The invention is further illustrated by the following non-limiting Examples.

5

EXAMPLES 1-4

Preparation of inks

The components shown in the following Table 1 were blended as described below to
10 produce inks suitable for use in sheet fed offset lithographic printing.

Table 1

			Example No.			
			1	2	3	4
Name	Supplier	Material	Yellow	Magenta	Cyan	Black
Talkum Finntalk M 05	Omya	Talcum	2.00	1.00	-	-
Aerosil R 972 V	Fischer	Pigment White 27	1.10	1.10	2.10	1.10
Irgalith LB1W	Ciba	Pigment Yellow 13	6.00	-	-	-
Permanent Yellow GRX 86	Clariant	Pigment Yellow 176	6.00	-	-	-
Diacetanil Orange R 3426C	Capelle	Pigment Orange 34	0.04	-	-	-
Symuler Brilliant Carmin 6B 308	DIC	Pigment Red 57:1	-	8.00	-	1.00
Symuler Brilliant Carmin 6B 303	DIC	Pigment Red 57:1	-	8.00	-	-
Fastogen Blue H 5375 SD	DIC	Pigment Blue 15:3	-	-	16.00	4.00
Russ Elftex 415	Cabot	Pigment Black 7	-	-	-	8.50
Russ Printex 25	Degussa	Pigment Black 7	-	-	-	8.50
Tergraf ND 2030	Cray Valley	Phenolic modified rosin ester	13.40	12.70	13.00	11.80
Tergraf 902	Cray Valley	Phenolic modified rosin ester	13.40	12.70	13.00	11.80
Uraplast 525	DSM	Trialkyl trimellitate	31.40	31.10	29.70	29.50
Coconut oil	Lechner & Crebert	Coconut oil refined	24.75	23.52	24.31	21.96
Printwax ME 0520	Deurex	Polyethylene	1.20	1.20	1.20	1.20
Additol VXL 12	Surface	Aluminium gelling	0.61	0.58	0.59	0.54

	Chemie	agent				
MTBHQ	Eastman	t-butylhydroquinone	0.10	0.10	0.10	0.10
Total			100.00	100.00	100.00	100.00

The coconut oil and approximately one half of the Uraplast 525 were added to a reaction vessel, stirred and heated to 180°C. Tergraf ND 2030 and Tergraf 902 were then added, ensuring that the temperature did not fall below 160°C. The mixture was heated up to 180°C and
5 held at that temperature for 60 minutes. Approximately another one half of the total amount of the Uraplast 525 was then added and the mixture was allowed to cool to 160°C. The gelling agent was then added with quick stirring, and the whole varnish was heated to 180°C and maintained at that temperature for 30 minutes. External cooling then reduced the temperature to 110°C, and the varnish was discharged from the reaction vessel.

10 The pigment(s) and other solid components (except the polyethylene wax) were dispersed in the varnish and the mixture was thoroughly mixed with a triple roller mill. The polyethylene wax was then added and the mixture was again passed over the triple roller mill for de-airing. The viscosity and tack were adjusted, prior to de-airing, by addition of small amounts of the trialkyl trimellitate, to give the final composition shown in Table 1.

15

EXAMPLE 5

Preparation of Ink

20 The following components were mixed to form a magenta ink, following essentially the same procedure as described in Examples 1-4. The amounts are parts by weight.

Name	Supplier	Material	Amount
Citrofol B1	Jungbunzlauer	Tributyl citrate	23.10
Beckosol HS 201-100	Reichhold	Unsaturated polyester	10.00
		Sodium aluminium silicate	0.80
Talkum Finntalk M 05	Omya	Talc	1.00
Symuler Brilliant Carmine	DIC	PR 57:1	16.50
Coconut oil	Lechner & Crebert	Coconut oil refined	23.50
Krumbhaar LR 10040	Eastman	Phenolic modified rosin ester	8.20
Tergraf 902	Cray Valley	Phenolic modified rosin ester	16.40
Additol VXL 12	Surface Chemie	Aluminium gelling agent	0.50
			100.00

EXAMPLE 6

Preparation of Ink

- 5 The following components were mixed to form a magenta ink, following essentially the same procedure as described in Examples 1-4. The amounts are parts by weight.

Name	Supplier	Material	Amount
Citrofol BII	Jungbunzlauer	Acetyltributyl citrate	17.90
Citrofol BI	Jungbunzlauer	Tributyl citrate	4.20
Foralyn 5020 F	Eastman	Hydrogenated resin	10.00
		Sodium aluminium silicate	0.80
Talkum Finntalk M 05	Omya	Talc	1.00
Symuler Brilliant Carmine6B 305	DIC	PR 57:1	16.50
Coconut oil	Lechner & Crebert	Coconut oil refined	24.50
Krumbhaar LR 10040	Eastman	Phenolic modified rosin ester	11.50
Tergraf 902	Cray Valley	Phenolic modified rosin ester	13.10
Additol VXL 12	Surface Chemie	Aluminium gelling agent	0.50
			100.00

EXAMPLE 7

Preparation of ink

5 The following components were mixed to form a magenta ink, following essentially the same procedure as described in Examples 1-4. The amounts are parts by weight.

Name	Supplier	Material	Amount
Citrofol B1	Jungbunzlauer	Tributyl citrate	20.90
Uraplast 525	DSM	Trialkyl mellitate	10.00
		Sodium aluminium silicate	0.80
Talkum Finntalk M 05	Omya	Talc	1.00
Symuler Brilliant Carmine 6B 306	DIC	PR 57:1	16.50
Coconut oil	Lechner & Crebert	Coconut oil refined	25.00
Krumbhaar LR 10040	Eastman	Phenolic modified rosin ester	8.40
Tergraf 902	Cray Valley	Phenolic modified rosin ester	16.90
Additol VXL 12	Surface Chemie	Aluminium gelling agent	0.50
			100.00

EXAMPLE 8

Preparation of ink

The following components were mixed to form a magenta ink, following essentially the
5 same procedure as described in Examples 1-4. The amounts are parts by weight.

Name	Supplier	Material	Amount
Citrofol B1	Jungbunzlauer	Tributyl citrate	8.00
Uraplast 525	DSM	Trialkyl mellitate	49.00
		Sodium aluminium silicate	0.80
Talkum Finntalk M 05	Omya	Talc	1.00
Symuler Brilliant Carmine 6B 306	DIC	PR 57:1	16.50
Krumbhaar LR 10040	Eastman	Phenolic modified rosin ester	11.30
Tergraf 902	Cray Valley	Phenolic modified rosin ester	12.90
Additol VXL 12	Surface Chemie	Aluminium gelling agent	0.50
			100.00

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EXAMPLE 9

Preparation of varnish

5 The following components were mixed to form a varnish, following essentially the same procedure as described in Examples 1-4. The amounts are parts by weight.

Name	Supplier	Material	Amount
Coconut oil	Lechner & Crebert	Coconut oil refined	27.00
Liponate TDTM	Lipo Chemical Inc.	Tridecyl mellitate	24.90
MTBHQ	Eastman	t-butylhydroquinone	0.10
Tergraf ND 2030	Cray Valley	Phenolic modified rosin ester	16.00
Tergraf 902	Cray Valley	Phenolic modified rosin ester	16.00
Liponate TDTM	Lipo Chemical Inc.	Tridecyl mellitate	14.00
Additol VXL 12	Surface Chemie	Aluminium gelling agent	2.00
			100.00

10

EXAMPLES 10-13

Preparation of Ink

15 The components listed in Table 2 were mixed to form inks, following essentially the same procedure as described in Examples 1-4. The amounts are parts by weight.

Table 2

			Example No.			
			10	11	12	13
Name	Supplier	Material	Yellow	Magenta	Cyan	Black
Talkum Finntalk M 05	Omya	Talcum	2.00	2.00	3.00	-
Sunbrite Yellow M 05	Sun Chemical	Pigment Yellow 13	12.00	-	-	-
Diacetanil Orange R 3426C	Capelle	Pigment Orange 34	0.04	-	-	-
Symuler Brilliant Carmin 6B 308	DIC	Pigment Red 57:1	-	8.00	-	1.00
Symuler Brilliant Carmin 6B 303	DIC	Pigment Red 57:1	-	8.00	-	-
Fastogen Blue H 5375 SD	DIC	Pigment Blue 15:3	-	-	16.00	4.00
Specialblack 250	Degussa	Pigment Black 7	-	-	-	20.00
Tergraf ND 2030	Cray Valley	Phenolic modified rosin ester	11.57	11.39	11.20	10.35
Tergraf 902	Cray Valley	Phenolic modified rosin ester	11.57	11.39	11.20	10.35
Liponate TDTM	Lipo Chemical Inc.	Tridecyl trimellitate	39.16	36.88	36.37	33.72
Coconut oil	Lechner & Crebert	Coconut oil refined	21.00	19.70	19.60	18.00
Printwax ME 0520	Deurex	Polylethylene	1.20	1.20	1.20	1.20
Additol VXL 12	Surface Chemie	Aluminium gelling agent	0.59	0.57	0.56	0.52
MTBHQ	Eastman	t-butylhydroquinone	0.07	0.07	0.07	0.06
Zeolite Powder 4A	Fischer	Sodium aluminium silicate	0.80	0.80	0.80	0.80

Total			100.00	100.00	100.00	100.00
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EXAMPLE 14

Preparation of printed material

Test prints were produced on a Heidelberg MO 4-colour press including a unit for application of water-based overprint varnishes. Press speed was between 7000-9000 sheets/hour, using a fountain solution containing 6-9% by volume isopropanol. Printing was carried out with standard optical densities, yellow = 1.35, magenta = 1.50, cyan = 1.40 and black = 1.80, using Fuji plates and Astral Premium blankets. The substrate used was Invercote G, which is a standard substrate for packaging. Prints were produced using a water-based overprint varnish. Rub tests were done after 24 hours, and all of the printing inks of the present invention gave satisfactory results.

EXAMPLE 15

Robinson test

The odour and taint caused by the inks of the present invention were tested by the well known Robinson test.

This is a test originally devised by the Technical Committee of the International Office of Cocoa and Chocolate to determine whether odours from packaging materials are transferred to cocoa and chocolate products. It is now also used more generally to check on the odour and taint likely to transfer from packaging materials used in the food industry. The test was carried out as follows:

A petri dish containing about 25 g of fresh grated milk chocolate was placed in a clean 1 litre preserving jar. 16 representative round samples (9 cm diameter, total area of the 16 samples 1017 cm²) of the packaging material to be evaluated were placed in the jar, so that sample and chocolate were not in contact with one another. A jar, the "blank", in all respects similar, but without any sample and a jar with unprinted substrate, were also prepared. The jars were closed

with a lid. They were then stored for 24 hours in a dark, odourless place at 23°C. A panel of tasters then compared the odour and then the flavour of the chocolate in each sample jar with the chocolate in the blank. The results were evaluated on the following scale:

- 0 = No difference in odour/flavour
- 1 = Odour/Flavour difference just perceptible
- 2 = Noticeable change in odour/flavour
- 3 = Significant change in odour/flavour
- 4= Intense change in odour/flavour

Four-colour (Black , Cyan, Magenta, Yellow) prints were produced by printing as described in Example 14, and were then tested. The sets of inks used were: Set A, standard offset inks, Irocart Process Inks, a set of currently available Sun Chemical conventional sheetfed offset inks containing driers; Set B, Irocart GN Low Hex ink, a set of currently available Sun Chemical conventional sheetfed offset inks formulated for low odour and low taint; Set C, the inks of Examples 1-4; and Set D, the ink of Example 7, and black, cyan and yellow inks prepared in the same way as that of Example 7. The results are shown in Table 3 below.

Table 3

Sample	Odour rating	Taint rating
Blank	0	0
Blank substrate	0.5	0
Set A	3.5	3.0
Set B	0.5	0.5
Set C	0.5	0.5
Set D	1.5	0.5
Ink from US 6,613,813	1.5	1.0
Reference/blank	0	0

It can be seen from these results that the compositions of the present invention (Examples 1 and 7) gave printed matter having comparable or better odour and comparable or lesser taint than the product of US 6,613,813.

EXAMPLE 16**Migration test**

Prints were prepared as described in Example 14 using the inks of Examples 1-4, or - for inks of Example 8 - using a standard Prüfbau laboratory proofing press.

In all cases, the prints were individually placed in a petri dish, and 1 g of clean Tenax® (an absorbent used to simulate dry and/or fatty foods; available from Akzo Nobel) was placed on the reverse of each print. After 10 days at 40°C, the Tenax® was extracted into diethyl ether and analysed using GC-MS (Gas Chromatography - Mass Spectrometry). The materials analysed for were Uraplast 525, Citrofol BI, coconut oil and the solvent used in US Patent No. 6,613,813, of which one trade name is Radia 7187. None was found within the detection limits of the analysis.

The invention has been described in terms of preferred embodiments thereof, but is more broadly applicable as will be understood by those skilled in the art. The scope of the invention is only limited by the following claims.

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CLAIMS:

1. An offset printing ink or varnish characterised in that the solvent comprises at least one water-insoluble ester of a polycarboxylic acid with an alcohol having at least 4 carbon atoms.
2. An offset printing ink or varnish according to Claim 1, in which from 45% to 90% by weight of said solvent comprises an ester of a polycarboxylic acid with an alcohol having at least 4 carbon atoms.
3. An offset printing ink or varnish according to Claim 2, in which from 50% to 80% by weight of said solvent comprises an ester of a polycarboxylic acid with an alcohol having at least 4 carbon atoms.
4. An offset printing ink or varnish according to Claim 2, in which from 55% to 65% by weight of said solvent comprises an ester of a polycarboxylic acid with an alcohol having at least 4 carbon atoms.
5. An offset printing ink or varnish according to any one of the preceding Claims, in which said alcohol has from 4 to 20 carbon atoms.
6. An offset printing ink or varnish according to Claim 5, in which said alcohol has from 6 to 10 carbon atoms.
7. An offset printing ink or varnish according to any one of the preceding Claims, in which said polycarboxylic acid has from 2 to 4 carboxylic acid groups.
8. An offset printing ink or varnish according to Claim 7, in which said polycarboxylic acid has 3 or 4 carboxylic acid groups.
9. An offset printing ink or varnish according to any one of the preceding Claims, in which said polycarboxylic acid is an aromatic polycarboxylic acid.
10. An offset printing ink or varnish according to Claim 9, in which said polycarboxylic acid is a benzenepolycarboxylic acid.
11. An offset printing ink or varnish according to Claim 10, in which said benzenepolycarboxylic acid is trimellitic acid.

12. An offset printing ink or varnish according to Claim 11, in which the ester is an ester of trimellitic acid with one or more straight chain saturated $C_8 - C_{10}$ aliphatic alcohols.
13. An offset printing ink or varnish according to Claim 11, in which the ester is tridecyl trimellitate.
14. An offset printing ink or varnish according to Claim 11, in which the ester is an ester of citric acid or acetylcitric acid.
15. An offset printing ink or varnish according to Claim 14, in which said ester is the butyl ester.
16. An offset printing ink or varnish according to any one of the preceding Claims, in which said solvent additionally comprises at least one triglyceride of $C_8 - C_{20}$ aliphatic carboxylic acids.
17. An offset printing ink or varnish according to Claim 16, in which said triglyceride is a triglyceride of $C_{10} - C_{18}$ aliphatic carboxylic acids.
18. An offset printing ink or varnish according to Claim 17, in which said triglyceride is coconut oil.

TINTAS O BARNICES OFFSET DE BAJA MIGRACIÓN, BAJO OLOR

La presente invención se relaciona con tintas de baja migración, de bajo olor novedosas para impresión litográfica offset, especialmente impresión litográfica offset "sheetfed".

La litografía offset "sheetfed" es un proceso de impresión dominante para la impresión de cartones de doblar para muchos propósitos, que incluyen uso como empaques de alimentos. Sin embargo, cuando la tinta va a ser utilizada sobre empaques de alimentos, es esencial, desde el punto de vista de la aceptación del cliente, que ésta no contamine el alimento o imparta algún olor no natural a ésta. Más aún, existe la tendencia creciente en la legislación de prescribir muy bajos niveles de contaminantes en los alimentos y otra materia que pudiera afectar la salud pública. La contaminación, en este contexto, puede resultar de migraciones de componentes de una tinta hacia la materia de alimentación u otro material empacado o de olores indeseables impartidos al material empacado por la tinta.

Existe, por lo tanto, necesidad de una tinta de impresión que se pueda utilizar para litografía offset "sheetfed" que permita poca o ninguna migración de sus componentes mientras es esencialmente inodora o tiene poco olor. La naturaleza del proceso litográfico offset también implica restricciones severas de la formulación de la tinta, como se explica en *The Printing Ink Manual* por R. H. Leach et al. [fifth edition (1993) páginas 342-346], y cumplir todos los requisitos no es tarea fácil.

Uno de los componentes olorosos principales de las cintas offset es el solvente utilizado. Este es de naturaleza de la litografía offset el solvente deba ser orgánico e insoluble en agua. Muchos solventes que tienen estas propiedades no son solamente altamente olorosos sino que también muchos de ellos son tóxicos en mayor o menor proporción. La escogencia de los solventes para este propósito es, por lo tanto, altamente restringida.

La Patente US No. 6,613,813 intenta solucionar estos problemas por medio del uso, inter alia, de un solvente que comprende un éster de un alcohol multivalente con un ácido graso. La composición puede opcionalmente contener un éster de alilo multifuncional de un ácido orgánico multivalente;

sin embargo, la función de estos ésteres es mejorar el proceso de secado al sufrir secado oxidativo, en lugar de servir como una parte sustancial del sistema solvente. Aunque la solución propuesta en la Patente Estadounidense No. 6,613,813 es efectiva, los ejemplos de la Patente parecen sugerir que un agente de secado adicional es necesario para lograr el secado requerido en un tiempo razonable.

Nosotros hemos ahora descubierto que una clase de compuesto basado en ácidos policarboxílicos son útiles como solventes para tintas de impresión offset y son capaces de dar numerosas mejoras sobre el número de tintas conocidas de la patente US, 6,613,813, que incluye un olor equivalente o inferior, migración equivalente o inferior, y estabilidad equivalente o mejorada sobre la prensa.

Así, la presente invención consiste de una tinta o barniz de impresión offset, particularmente útil en la impresión litográfica offset sheetfed, caracterizada por que el solvente comprende al menos un éster insoluble en agua de un ácido policarboxílico con un alcohol monohídrico que tiene al menos 4 átomos de carbono.

En la medida en que el proceso de secado oxidativo y los sub-productos generados por éste son una fuente importante del desarrollo del olor en las impresiones terminadas, es necesaria una selección cuidadosa de la materia prima. Los secadores así como también la materia prima con potencial de secado oxidativo como se utiliza en las tintas sheetfed convencionales deben ser preferiblemente excluidos. Una buena resistencia a la fricción en el trabajo de impresión se puede lograr al utilizar las tintas de la presente invención en combinación con un barniz de sobre impresión basado en agua (OVP).

La composición de las tintas o barnices de impresión para la impresión litográfica offset, que incluye impresión litográfica offset sheetfed, es muy bien conocida y se describe con considerable detalle en, por ejemplo, *The Printing Ink Manual* (supra) páginas 342-452, en las Patentes US No. 5,382,282, No. 5,752,646 y 6,489,375.

En términos generales, una tinta de impresión litográfica debe tener una tensión superficial baja, ser repelente al agua, ser capaz de emulsificar con una solución fuente, y, para la litografía offset sheetfed convencional debe ser capaz de secar sin radiación. Estos requerimientos muy

particulares son cumplidos por la formulación cuidadosa y la escogencia de varios componentes y es bien conocida en la industria de tinta de impresión.

El solvente utilizado en la composición de tinta o barniz de la presente invención es un éster insoluble en agua de un ácido policarboxílico con un alcohol que tiene al menos 4 átomos de carbono. El ácido policarboxílico puede ser aromático o alifático aunque es preferiblemente aromático, y debe tener más de un grupo de ácido carboxílico. Preferiblemente, el ácido tiene de 2 a 4, más preferiblemente 3, grupos de ácido carboxílico.

Ejemplos de ácidos policarboxílicos aromáticos incluyen: ácido trimelítico, ácido ftálico, ácido isoftálico, ácido tereftálico, ácido 1,2,3-bencenotricarboxílico, ácido 1,2,4-bencenotricarboxílico, ácido 1,3,5-bencenotricarboxílico, ácido 1,2,3,4-bencenotetracarboxílico, ácido 1,2,3,5-bencenotetracarboxílico, ácido 1,2,4,5-bencenotetracarboxílico, ácido 1,3,5-naftalenotricarboxílico, ácido 1,3,6-naftalenotriacético, ácido 6-carboxi-1-carboximetil-2-naftalenopropiónico, ácido 1,4,5,8-naftalenotetracarboxílico, ácido 3,3',4,4'-bifeniltetracarboxílico y ácido 3,4,9,10-

perilenotetracarboxílico. De éstos, el preferido es el ácido trimelítico.

Ejemplos de ácidos policarboxílicos alifáticos incluyen: ácidos dicarboxílicos, tal como ácido oxálico, ácido malónico, ácido succínico, ácido glutárico, ácido adípico, ácido pimélico, ácido subérico, ácido azelaico, ácido sebásico, ácido tartrónico, ácido málico y ácido tartálico; ácidos tricarboxílicos, tales como ácido cítrico, ácido acetilcítrico, ácido 2-hidroxi-2-metilpropano-1,2,3-tricarboxílico, ácido pentano-1,3,5-tricarboxílico, ácido 1,2,3-propanotricarboxílico, y ácido 7-metil-1,7,9-decanotricarboxílico; y ácidos tetracarboxílicos, tales como ácido 1,2,3,4-butanotetracarboxílico, ácido ciclopentano-1,2,3,4-tetracarboxílico, ácido 2,3,4,5-tetracarboxitetrahidrofurano, y, ácido 1,1,12,12-dodecanotetracarboxílico.

El alcohol monohídrico con los cuales estos ácidos policarboxílicos forman ésteres tiene al menos 4 átomos de carbono, y preferiblemente de 4 a 20, más preferiblemente de 4 a 18, y aun más preferiblemente de 6 a 10 átomos de carbono. Ejemplos de tales alcoholes incluye: butanol, sec-butanol, t-butanol, pentanol, hexanol, heptanol, octanol,

nonanol, decanol, undecanol, dodecanol, tidecanol, tetradecanol, pentadecanol, hexadecanol, heptadecanol, octadecanol, nonadecanol, icosanol, hexan-2-ol, 2,3-dimetilbutan-2-ol, 3-metil-pentan-1-ol, 3,3-dimetilbutan-2-ol, y 2,3,3-trimetilbutan-2-ol.

Un solvente de éster de ácido policarboxílico particularmente preferido de acuerdo con la presente invención es aquel vendido bajo el nombre comercial Uraplast 525 por DSM Resins bv. Este es un trimelitato de trialquilo de baja viscosidad basado en alcoholes C_8 - C_{10} . Este ha sido previamente utilizado como un plastificador. Otros solventes adecuados incluyen trimelitato de tridecilo, citrato de tributilo y citrato de acetil tributilo.

Con el fin de que el éster del ácido policarboxílico y el alcohol monohídrico sean capaces de funcionar como solventes, es normalmente importante que su peso molecular esté dentro de un rango específico. En general, un peso molecular de al menos 250, y más preferiblemente al menos 300, se prefiere, el peso molecular preferido máximo es de 1000. Así, el peso molecular es preferiblemente de 250 a 1000, más preferiblemente de 300 a 1000 y aún más preferiblemente de 500 a 800.

Aunque el éster de ácido policarboxílico se puede utilizar como un solvente solo en las composiciones de la presente invención, puede ser necesario, con el fin de lograr las propiedades reológicas correctas incluir también otro solvente. Este otro solvente, si está presente, preferiblemente no excede el 60% del solvente total presente en la composición. Más preferiblemente, del 45 al 90%, aún más preferiblemente del 50% al 80%, y más preferiblemente del 55% al 65% en peso de dicho solvente comprende el éster de ácido policarboxílico.

Si está presente otro solvente, cualquier solvente convencionalmente utilizado en tintas litográficas se puede emplear, siempre y cuando no tenga potencial de secado oxidativo y que éste no tienda a migrar desde la tinta seca. Ejemplos de otros solventes incluyen triglicéridos de ácidos carboxílicos alifáticos C_8-C_{20} , por ejemplo, aceite de coco, tal como aquel vendido bajo el nombre comercial Kokosöl por Lechner y Crebert.

El solvente, o la mezcla de solventes, utilizada en la presente invención tienen preferiblemente un punto de fusión tal que es líquido a temperatura en la cual la tinta o barniz

de impresión va a ser utilizada. Esto significa normalmente que éste debe ser líquido a temperaturas de la prensa de impresión, y preferiblemente temperatura de ambiente, por ejemplo, a temperatura por encima de 10-15°C. En algunos casos, sin embargo, por ejemplo si la tinta o barniz de impresión van a ser utilizados solamente en una atmósfera caliente, puede ser posible que el solvente sea sólido a estas temperaturas, siempre y cuando este funda a una temperatura más alta, por ejemplo alrededor de 25°C.

Un componente de resina en una composición de tinta litográfica o barniz funciona, entre otras cosas, como un formador de película para unir el barniz y el pigmento juntos y, cuando la tinta o el barniz se secan, unir la misma al sustrato receptor. El componente de resina también contribuye a las propiedades de dureza, brillo, adhesión y flexibilidad de una tinta y debe ser compatible con el componente de solvente del barniz. En los sistemas oleoresinosos convencionales, el componente de resina comúnmente comprende un primer o componente de resina dura y un segundo componente de resina que típicamente es un alquido o resina de poliéster, pero que puede comprender varias otras composiciones y resinas también.

Las resinas duras utilizables en las tintas litográficas o barnices de la presente invención incluyen, por ejemplo, resinas naturales o procesadas resinas tales como abetinotes, ésteres de abetinotes, resinas modificadas maleicas, resinas fumáricas modificadas de abetinote, abetinote dimerizado y polimerizado, fenólicos, fenólicos modificados de abetinote, terpeno, poliamidas, cauchos y clisado, acrílicos, hidrocarburos, e hidrocarburos modificados, también incluidos entre las resinas disponibles están aquellas identificadas en *The Printing Ink Manual*, supra, la sustancia se incorpora aquí como referencia.

Las tintas litográficas de la presente invención usualmente incluirán al menos un pigmento, la naturaleza del cual no es crítica para la presente invención, y se puede escoger de cualquiera de aquellos pigmentos bien conocidos por aquellos expertos en la técnica. Alternativamente, la tinta puede incluir un entendedor. Los barnices normalmente no incluirán ningún pigmento o entendedor en su composición.

Además, si se desea, podrían estar presentes otros aditivos, tales como ceras antioxidantes, compuestos antiseparación, aditivos litográficos y modificadores de reología. Estos son

de manera similar bien conocidos por aquellos expertos en la técnica.

La invención se ilustra además en los siguientes ejemplos no limitantes.

EJEMPLOS 1-4

Preparaciones de tintas

Los componentes mostrados en la siguiente Tabla 1 fueron mezclados como se describe adelante para producir tintas adecuadas para uso en la impresión litográfica offset sheetfed.

			Ejemplo No.			
			1	2	3	4
Nombre	Suministrador	Material	Amari llo	Magen ta	Cian	Negro
Talkum Finntalk M 05	Omya	Talco	2.00	1.0	-	-
Aerisil R 972 V	Fischer	Pigment White 27	1.10	1.10	2.10	1.10
Irgalith LBIW	Ciba	Pigment Yellow 13	6.00	-	-	-
Permanent	Clariant	Pigment	6.00	-	-	-

Yellow GRX 86		Yellow 176				
Diacetani 1 Orange R 3426C	Capelle	Pigment Orange 34	0.04	-	-	-
Symuler Brilliant Carmin 6B 308	DIC	Pigment Red 57:1	-	8.00	-	1.00
Symuler Brilliant Carmin 6B 303	DIC	Pigment Red 57: 1	-	8.00	-	-
Fastogen- Blue H 5375 SD	DIC	Pigment Blue 15: 3	-		16.00	4.00
Russ Elftex 415	Cabot	Pigment Black 7	-	-	-	8.50
Russ Printex 25	Degussa	Pigment Black 7	-	-	-	8.50
Tergraf ND 2030	Cray Valley	Éster Abetinotis Modificado fenólico	13.40	12.70	13.00	11.80
Tergraf 902	Cray Valley	Ester de abetinoti Modificado fenólico	13.40	12.70	13.00	11.80
Uraplast	DSM	Trialquil	31.40	31.10	29.70	29.50

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525		trimelitato				
Coconut oil	Lechner & Crebeet	Aceite de coco refinado	24.75	23.52	24.31	21.96
Printwax ME 0520	Deurex	Polietileno	1.20	1.20		1.20
Aditol VXL 12	Surface	Gel de aluminio	0.61	0.58	0.59	0.54
	Chemie	Agente				
MTBHQ	Eastman	t-butilhidro quinona	0.10	0.10	0.10	0.10
Total			100.00	100.00	100.00	100.00

El aceite de coco y aproximadamente una mitad del Uraplast 525 se agregaron a un recipiente de reacción, se agitaron y calentaron a 180°C. Tergraf ND 2030 y Tergraf 902 fueron entonces agregados, asegurando que la temperatura no caiga por debajo de 160°C. La mezcla fue calentada a 180°C y se mantuvo a esa temperatura durante 60 minutos. Aproximadamente otra vez y media de la cantidad total de Uraplast 525 fue agregada entonces a la mezcla y se le permitió enfriarse a 160°C. El agente de gel fue luego agregado con agitación rápida, y el barniz total se calentó a 180°C y se mantuvo a esa temperatura durante 30 minutos. El enfriamiento externo entonces redujo la temperatura a 110°C, y el barniz se descargó del bazo de reacción.

En los pigmentos y los otros componentes (excepto la cera de polietileno) se dispersaron en el barniz y la mezcla fue completamente mezclada con un molino de rodillo triple. La cera de polietileno fue entonces agregada y la mezcla fue de nuevo pasada sobre el molino de rodillo triple para des-aireado. La viscosidad y la pegajosidad fueron ajustadas, antes del des-aireado, mediante la adición de pequeñas cantidades de triálquil trimelitato, para dar la composición final mostrada en la Tabla 1.

EJEMPLO 5

Preparación de tinta

Los siguientes componentes fueron mezclados para formar una tinta magenta, luego esencialmente del mismo procedimiento como se describió en los Ejemplos 1-4 las cantidades son partes en peso.

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Nombre	Suministrador	Cantidad	Material
Citrofol B1	Jungbunzlauer	Tributil citrato	23.10
Beckosol HS 201-100	Reichhold	Poliéster insaturado	10.00
		Aluminio silicato de sodio	0.80
Talkum Finntalk M 05	Omya	Talco	1.00
Symuler Brilliant Carmine	DIC	PR 57: 1	16.50
Coconut oil	Lechner & Crebert	Aceite de coco refinado	23.50
Krumbhaar LR 10040	Eastman	Ester de betinoti modificado fenólico	8.20
Tergraf 902	Cray Valley	Ester de betinoti modificsado fenólico	16.40
Additol VXL 12	Surface Chemie	Agente gelante de aluminio	0.50
			100.00

EJEMPLO 6

Preparación de tinta

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Los siguientes componentes fueron mezclados para formar una tinta magenta, luego esencialmente el mismo procedimiento como se describió en los Ejemplos 1-4. Las cantidades son partes en peso.

Nombre	Suministrador	Material	Cantidad
Citrofol BII	Jungbunzlauer	Acetiltributil citrato	23.10
Citrofol BI	Jungbunzlauer	Tributil citrato	10.00
Foralyn 5020 F	Eastman	Resina hidrogenada	0.80
		Aluminio silicato de sodio	
Talkum Finntalk M 05	Omya	Talco	1.00
Symuler Brilliant Carmine 6B 305	DIC	PR 57: 1	16.50
Coconut oil	Lechner & Crebert	Aceite de coco refinado	23.50
Krumbhaar LR 10040	Eastman	Ester de betinoti modificado fenólico	8.20
Tergraf 902	Cray Valley	Ester de betinoti modificado	16.40

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		fenólico	
Additol VXL 12	Surface Chemie	Agente gelificante de aluminio	0.50
			100.00

EJEMPLO 7

Preparación de tinta

Los siguientes componentes se mezclan para formar una tinta magenta, siguiendo esencialmente el mismo procedimiento como se describe en los Ejemplos 1-4. Las cantidades son en partes por peso.

Nombre	Proveedor	Material	Cantidad
Citrofol B1	Jungbunzlauer	Citrato de tributilo	20.90
Uraplast 525	DSM	Melitato de trialquilo	10.00
		Silicato de aluminio sodio	0.80
Talkum Finntalk M 05	Omya	Talco	1.00
Symuler Brilliant Carmine	DIC	PR 57:1	16.50

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6B 306			
Aceite de coco	Lechner & Crebert	Aceite de coco refinado	25.00
Krumbhaar LR 10040	Eastman	Éster de rosina fenólico modificado	8.40
Tergraf 902	Cray Valley	Éster de rosina fenólico modificado	16.90
Additol VXL 12	Surface Chemie	Agente gelante de aluminio	0.50
			100.00

EJEMPLO 8

Preparación de tinta

Se mezclan los siguientes componentes para formar una tinta magenta, siguiendo esencialmente el mismo procedimiento como se describe en los Ejemplos 1-4. Las cantidades son en partes por peso.

Nombre	Proveedor	Material	Cantidad
Citrofol B 1	Jungbunzlauer	Citrato de tributilo	8.00

Uraplast 525	DSM	Melitato de trialquilo	49.00
		Silicato de aluminio sodio	0.80
Talkum Finntalk M 05	Omya	Talco	1.00
Symuler Brilliant Carmine 6B 306	DIC	PR 57:1	16.50
Krumbhaar LR 10040	Eastman	Ester de rosina fenólico modificado	11.30
Tergraf 902	Cray Valle y	Ester de rosina fenólico modificado	12.90
Additol VXL 12	Surface Chemie	Agente gelante de aluminio	0.50
			100.00

EJEMPLO 9

Preparación de barniz

Se mezclan los siguientes componentes para formar un barniz, siguiendo esencialmente el mismo procedimiento como se describe en los Ejemplos 1-4. Las cantidades son en partes por peso.

Nombre	Proveedor	Material	Cantidad
Aceite de coco	Lechner & Crebert	Aceite de coco refinado	27.00
Liponate TDTM	Lipo Chemical Ine.	Melitato de tridecilo	24.90
MfBHQ	Eastman	t-butilhidroquinona	0.10
Tergraf ND 2030	Cray Valley	Éster de rosina fenólico modificado	16.00
Tergraf 902	Cray Valley	Éster de rosina fenólico modificado	16.00
Liponate TDTM	Lipo Chemical Ine.	Melitato de tridecilo	14.00
Additol VXL 12	Surface Chemie	Agente gelante de aluminio	2.00
			100.00

EJEMPLOS 10-13

Preparación de tinta

Los componentes listados en la Tabla 2 se mezclan para formar tintas, siguiendo esencialmente en mismo procedimiento como se describe en los Ejemplos 1-4. Las cantidades son en partes por peso.

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			Ejemplo No.			
			10	11	12	13
Nombre	Proveedor	Material	Amarillo	Magenta	Ciano	Negro
Talkum Finntalk M 05	Omya	Talco	2.00	2.00	3.00	-
Sunbrite Amarillo M05	Sun Chemical	Pigmento Amarillo 13	12.00	-	-	-
Diacetanil Naranja R 3426C	Capelle	Pigmento Naranja 34	0.04	-	-	-
Symuler Brilliant Carmin 6B 308	DIC	Pigmento Rojo 57:1	-	8.00	-	1.00
Symuler Brilliant Carmin 6B 303	DIC	Pigmento Rojo 57:1	-	8.00	-	-
Fastogen Blue H 5375 SD	DIC	Pigmento Azul 15:3	-	-	16.00	4.00
Speeialblack	Degusssa	Pigmento Negro 7	-	-	-	20.00

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250						
Tergraf ND 2030	Cray Valley	Éster de rosina fenólico modificado	11.57	11.39	11.20	10.35
Tergraf 902	Cray Valley	Éster de rosina fenólico modificado	11.57	11.39	11.20	10.35
Liponate TDTM	Lipo Chemical Ine.	Trimelitato de Tridecilo	39.16	36.88	36.37	33.72
Coconut oil	Leehner & Crebert	Aceite de coco refinado	21.00	19.70	19.60	18.00
Printwax :ME 0520	Deurex	Polietileno	1.20	1.20	1.20	1.20
Additol VXL 12	Surface Chemie	Agente gelante de aluminio	0.59	0.57	0.56	0.52
MTBHQ	Eastman	t- butilhidroquinona	0.07	0.07	0.07	0.06
Zeolita Powder 4A	Fischer	Silicato de aluminio sodio	0.80	0.80	0.80	0.80
TOTAL			100.00	100.00	100.00	100.00

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EJEMPLO 14

Preparación de material impreso

Se producen ensayos de impresión sobre una prensa Heidelberg MO de 4 colores que incluye una unidad para aplicación de barnices sobreimpresos basados en agua. La velocidad de impresión estuvo entre 7000-9000 hojas/hora, utilizando una solución fuente que contiene 6-9% por volumen de isopropanol. La impresión se lleva a cabo con densidades ópticas estándar, amarillo = 1.35, magenta = 1.50, ciano = 1.40 y negro = 1.80, utilizando placas Fuji y mantillas Astral Premium. Se utiliza el sustrato Invercote G, que es un sustrato estándar para empaque. La impresión se produce utilizando un barniz de sobreimpresión basado en agua. Los ensayos Rub se hicieron después de 24 horas, y todas las tintas de impresión de la presente invención produjeron resultados satisfactorios.

EJEMPLO 15

Ensayo Robinsón

El olor y contaminación originada por las tintas de la presente invención se ensaya mediante la prueba Robinson bien conocida.

Este es un ensayo ideado originalmente por el Comité Técnico de la Oficina Internacional de Cacao y Chocolate para determinar si los olores de los materiales de empaque se transfieren a los productos de cacao y chocolate. Ahora también se utiliza más generalmente para controlar el olor y contaminación apropiados para transferencia de los materiales de empaque utilizados en la industria alimenticia. El ensayo se lleva a cabo como sigue:

Un plato petri que contiene aproximadamente 25 g de leche achocolatada fresca se coloca en una jarra limpia de 1 litro. Se colocan 16 muestras representativas (de 9 cm diámetro, área total de las 16 muestras 1017 cm²) de material de empaque para ser evaluado en la jarra, de tal forma que la muestra y el chocolate no están en contacto el uno con el otro. Una jarra, el "blanco", similar en todos los aspectos, pero sin ninguna muestra y una jarra con el sustrato no impreso, también se prepara. Las jarras se cierran con una tapa. Ellas se almacenan luego durante 24 horas en la oscuridad, en un lugar inodoro a 23° C. Un panel de catadores

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compara luego el olor y luego el sabor del chocolate en cada jarra de muestra con el chocolate en el blanco. Se evalúan los resultados en la siguiente escala:

- 0 = Sin diferencia en olor/sabor
- 1 = Diferencia de olor/sabor perceptible
- 2 = Cambios notables en olor/sabor
- 3 = Cambio significativo en olor/sabor
- 4 = Cambio intenso en olor/sabor.

Se producen impresiones de cuatro colores (Negro, Ciano, Magenta, Amarillo) al imprimir como se describe en el Ejemplo 14, y se ensayan luego. Los conjuntos de tinta utilizados fueron: Conjunto A, tintas estándar offset, Tintas Irocart Process, un conjunto de tintas offset para "sheetfed" convencional de Sun Chemical actualmente disponibles que contienen secadores; conjunto B, tintas Irocart NG Low Hex, un conjunto de tintas offset de "sheetfed" convencional de Sun Chemical actualmente disponible formulada para bajo olor y baja contaminación; Conjunto C, las tintas de los Ejemplos 1-4; y el Conjunto D, las tintas del Ejemplo 7, y tintas negaras, cian y amarillo preparadas en la misma forma como aquella del Ejemplo 7. Los resultados se muestran en la Tabla 3 adelante.

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Tabla 3

Muestra	Proporción de olor	Proporción de contaminación
Blanco	0	0
Sustrato Blanco	0.5	0
Conjunto A	3.5	3.0
Conjunto B	0.5	0.5
Conjunto C	0.5	0.5
Conjunto D	1.5	0.5
Tinta de US 6,613,813	1.5	1.0
Referencia/blanco	0	0

Se puede ver a partir de estos resultados que las composiciones de la presente invención (Ejemplos 1 y 7) dan la materia impresa que tiene olor comparable o mejor y contaminación comparable o menor que el producto de la US 6,613,813.

EJEMPLO 16

Ensayo de migración

Se preparan tintas como se describe en el Ejemplo 14 utilizando las tintas de los Ejemplos 1-4, o -para las tintas del Ejemplo 8- utilizando una prensa para prueba de laboratorio estándar Prüfbau.

En todos los casos, las impresiones se colocaron individualmente en un plato petri, y se coloca 1 g de clean Tenax® (un absorbente utilizado para simular alimentos secos y/o grasos; disponible de Akzo Nobel) en el reverso de cada impresión. Después de 10 días a 40° C, se extrae el Tenax® en dietil éter y se analiza utilizando GC-MS Cromatografía de Gas - Espectrometría de Masa). Los materiales analizados fueron Uraplast 525, Citrofol BI, aceite de coco y el solvente utilizado en la Patente Estadounidense No. 6,613,813, del cual el nombre comercial es Radia 7187. Ninguno se encuentra dentro de los límites de detección del análisis.

La invención se ha descrito en términos de las modalidades preferidas de estas, pero es más ampliamente aplicable como se entenderá por un experto en la técnica. El alcance de la invención solo se limita por las siguientes reivindicaciones.

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REIVINDICACIONES

1. Una tinta de impresión offset o barniz caracterizada en que el solvente comprende al menos un éster insoluble en agua de un ácido policarboxílico con un alcohol que tiene al menos 4 átomos de carbono.
2. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 1, en la que de 45% a 90% en peso de dicho solvente comprende un éster de un ácido policarboxílico con un alcohol que tiene al menos 4 átomos de carbono.
3. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 2, en la que de 50% a 80% en peso de dicho solvente comprende un éster de un ácido policarboxílico con un alcohol que tiene al menos 4 átomos de carbono.
4. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 2, en la que de 55% a 65% en peso de dicho solvente comprende un éster de un

ácido policarboxílico con un alcohol que tiene al menos 4 átomos de carbono.

5. Una tinta de impresión offset o barniz de acuerdo con una cualquiera de las Reivindicaciones precedentes, en la que dicho alcohol tiene de 4 a 20 átomos de carbono.
6. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 5, en la que dicho alcohol tiene de 6 a 10 átomos de carbono.
7. Una tinta de impresión offset o barniz de acuerdo con una cualquiera de las Reivindicaciones precedentes, en la que dicho ácido policarboxílico tiene de 2 a 4 grupos de ácido policarboxílico.
8. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 7, en la que dicho ácido policarboxílico tiene 3 o 4 grupos de ácido policarboxílico.
9. Una tinta de impresión offset o barniz de acuerdo con una cualquiera de las Reivindicaciones

precedentes, en la que dicho ácido policarboxílico es un ácido policarboxílico aromático.

10. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 9, en la que dicho ácido policarboxílico es un ácido bencenopolicarboxílico.
11. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 10, en la que dicho ácido bencenopolicarboxílico es ácido trimelítico.
12. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 11, en la que el éster es un éster de ácido trimelítico con uno o más alcoholes alifáticos C₈-C₁₀ saturados de cadena recta.
13. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 11, en la que el éster es trimelitato tridecilo.
14. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 11, en la que el éster es un éster de ácido cítrico o ácido acetilcítrico.

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15. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 14, en la que dicho ester es éster de butilo.
16. Una tinta de impresión offset o barniz de acuerdo con una cualquiera de las Reivindicaciones precedentes, en la que dicho solvente comprende adicionalmente al menos un triglicérido de ácido carboxílico alifático C_8-C_{20} .
17. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 16, en la que dicho triglicerido es un triglicérido de ácido carboxílico alifático $C_{10}-C_{18}$.
18. Una tinta de impresión offset o barniz de acuerdo con la Reivindicación 17, en la que dicho triglicerido es aceite de coco.

TINTAS O BARNICES OFFSET DE BAJA MIGRACIÓN, BAJO OLOR**Resumen**

Una tinta o barniz de impresión offset utiliza como un solvente al menos un éster insoluble en agua de un ácido policarboxílico con un alcohol que tiene al menos 4 átomos de carbono.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/008504A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C09D11/02 B41M1/06

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 7 C09D B41M

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, PAJ, 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	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 08, 5 August 2002 (2002-08-05) & JP 2002 121452 A (SAKATA CORP), 23 April 2002 (2002-04-23) abstract	1-7
X	US 5 965 633 A (REVOL ET AL) 12 October 1999 (1999-10-12) column 4, lines 4,5; claim 1	1,5-7
A	US 6 613 813 B1 (BORGSMANN URSULA ET AL) 2 September 2003 (2003-09-02) cited in the application column 1, lines 3-8; claims 1-10 column 1, line 42 - column 3, line 13	1-18

☐ 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
- *E* earlier document but published on or after the International filing date
- *L* document which may throw doubt 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
- *A* document member of the same patent family

Date of the actual completion of the International search

2 June 2005

Date of mailing of the International search report

09/06/2005

Name and mailing address of the ISA
European Patent Office, P B 5818 Patentkan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx 31 651 epo nl,
Fax (+31-70) 340-3018

Authorized officer

Dury, O

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/008504

63

Box I 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:
see FURTHER INFORMATION sheet PCT/ISA/210
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 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:

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: -

Present claims 1-18 relate to solvent which are esters of a polycarboxylic acid with an alcohol (generic term). Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only esters of polycarboxylic acid with monoalcohols (see page 3, lines 11-17).

In the present case, the claims so lack support, and the application so lacks disclosure, that the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to esters of a polycarboxylic acid with a monohydric alcohol.

Besides, the term "water insoluble" is vague and is considered as a non limiting feature.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/008504

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 2002121452	A	23-04-2002	NONE	
US 5965633	A	12-10-1999	AT 177464 T AU 5512596 A DE 69601706 D1 DE 69601706 T2 DK 823931 T3 EP 0823931 A1 ES 2130815 T3 WO 9634923 A1 JP 11505556 T NO 975059 A	15-03-1999 21-11-1996 15-04-1999 14-10-1999 27-09-1999 18-02-1998 01-07-1999 07-11-1996 21-05-1999 03-11-1997
US 6613813	B1	02-09-2003	DE 19653828 A1 AT 199736 T CA 2245178 A1 WO 9828373 A1 DE 59703142 D1 DK 886671 T3 EP 0886671 A1 ES 2155706 T3	25-06-1998 15-03-2001 02-07-1998 02-07-1998 19-04-2001 23-07-2001 30-12-1998 16-05-2001

\$65

PCT

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference C-301	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No PCT/US2005/008504	International filing date (day/month/year) 14/03/2005	(Earliest) Priority Date (day/month/year) 12/03/2004
Applicant SUN CHEMICAL CORPORATION		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 05 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1 Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any nucleotide and/or amino acid sequences disclosed in the international application, see Box No. I.

2 ☒ Certain claims were found unsearchable (See Box II).**3** ☐ Unity of invention is lacking (see Box III).**4 With regard to the title,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. _____

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International Application No
CT/US2005/008504A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C09D11/02 B41M1/06

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 7 C09D B41M

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, PAJ, 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	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 08, 5 August 2002 (2002-08-05) & JP 2002 121452 A (SAKATA CORP), 23 April 2002 (2002-04-23) abstract	1-7
X	US 5 965 633 A (REVOL ET AL) 12 October 1999 (1999-10-12) column 4, lines 4,5; claim 1	1,5-7
A	US 6 613 813 B1 (BORGMANN URSULA ET AL) 2 September 2003 (2003-09-02) cited in the application column 1, lines 3-8; claims 1-10 column 1, line 42 - column 3, line 13	1-18

☐

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

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

A document member of the same patent family

Date of the actual completion of the international search

2 June 2005

Date of mailing of the international search report

09/06/2005

Name and mailing address of the ISA

European Patent Office, P B 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Dury, O

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: -

Present claims 1-18 relate to solvent which are esters of a polycarboxylic acid with an alcohol (generic term). Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only esters of polycarboxylic acid with monoalcohols (see page 3, lines 11-17).

In the present case, the claims so lack support, and the application so lacks disclosure, that the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to esters of a polycarboxylic acid with a monohydric alcohol.

Besides, the term "water insoluble" is vague and is considered as a non limiting feature.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/008504

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Box 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
see FURTHER INFORMATION sheet PCT/ISA/210
- 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 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

- 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

PCT/US2005/008504

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 2002121452	A	23-04-2002	NONE	
US 5965633	A	12-10-1999	AT 177464 T AU 5512596 A DE 69601706 D1 DE 69601706 T2 DK 823931 T3 EP 0823931 A1 ES 2130815 T3 WO 9634923 A1 JP 11505556 T NO 975059 A	15-03-1999 21-11-1996 15-04-1999 14-10-1999 27-09-1999 18-02-1998 01-07-1999 07-11-1996 21-05-1999 03-11-1997
US 6613813	B1	02-09-2003	DE 19653828 A1 AT 199736 T CA 2245178 A1 WO 9828373 A1 DE 59703142 D1 DK 886671 T3 EP 0886671 A1 ES 2155706 T3	25-06-1998 15-03-2001 02-07-1998 02-07-1998 19-04-2001 23-07-2001 30-12-1998 16-05-2001

PATENT COOPERATION TREATY

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From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To see form PCT/ISA/220

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**
(PCT Rule 43bis 1)

Date of mailing (day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference see form PCT/ISA/220	FOR FURTHER ACTION See paragraph 2 below
---	--

International application No PCT/US2005/008504	International filing date (day/month/year) 14.03.2005	Priority date (day/month/year) 12.03.2004
---	--	--

International Patent Classification (IPC) or both national classification and IPC C09D11/02, B41M1/06
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Applicant SUN CHEMICAL CORPORATION

1. This opinion contains indications relating to the following items

- ☒ Box No. I Basis of the opinion
- ☐ 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 Rule 43bis 1(a)(i) 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

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66 1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA. European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx 523856 epmu d Fax +49 89 2399 - 4465	Authorized Officer Dury, O Telephone No. +49 89 2399-8313
---	---



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/008504

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Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing
 - ☐ contained in the international application as filed
 - ☐ filed together with the international application in computer readable form
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments.

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. -

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*)

☒ the claims, or said claims Nos. 1-18(partly) are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the whole application or for said claims Nos 1-18(partly)

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See separate sheet for further details

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Box No. V Reasoned statement under Rule 43b/s.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes. Claims	8-18
	No. Claims	1-7
Inventive step (IS)	Yes. Claims	8-18
	No. Claims	1-7
Industrial applicability (IA)	Yes. Claims	1-18
	No. Claims	

2 Citations and explanations

see separate sheet

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Concerning Paragraph III

The subject matter of claims 1-18 has only been searched for solvents which are esters of a polycarboxylic acid with a monohydric alcohol having at least 4 carbon atoms. The present opinion is, thus, written for that part of the application which has been searched (Rule 70.2.d PCT).

Concerning Paragraph V

1. Relevant document:

D1: JP 2002 121452 A (Abstract and online translation)

D2: US-A-5 965 633

D3: US-B1-6 613 813

2. Novelty: Art. 33(2) PCT

2.1 a) D1 discloses ink compositions for offset printing comprising (II) a diester compound of an aliphatic dibasic acid. According to the online translation of D1, the latter is illustrated in par. 16 and 41 and appears to be typically used in an amount of 40-60 w.% (D1, par. 25). The subject matter of claims 1-7 is, thus, not novel.

b) D2 discloses ink compositions for offset printing comprising as solvent e.g. dibutyl and di-2-ethylhexyl adipates and sebacates (selection within a single list of alternative solvents). The subject matter of claims 1 and 5-7 is not novel.

2.2 D3 discloses ink compositions for offset printing comprising as solvent an ester of a polyalcohol with a monocarboxylic acid. The solvents presently claimed are not disclosed in D3.

3 Inventive step: Art. 33(3) PCT

Starting from D3 as closest prior art (D3 also deals with low migration low odour offset inks for food wrapping), the skilled person would have found no motivation in the cited prior art to provide improved inks (see comparative data of Table 3, page 15 of the application) by using esters according to claims 8-15 on file or to use as solvent a combination of an ester according to claims 1-7 and a triglyceride according to claims 16-18. The subject matter of claims 8-18 may, thus, be acknowledged an inventive step.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/008504

4. The subject matter of claims 1-18 is industrially applicable

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Patent Abstracts of Japan

PUBLICATION NUMBER : 2002121452
PUBLICATION DATE : 23-04-02

APPLICATION DATE : 12-10-00
APPLICATION NUMBER : 2000312420

APPLICANT . SAKATA CORP;

INVENTOR . IWASE KOJI;

INT.CL : C09D 11/10

TITLE : INK COMPOSITION FOR OFFSET
PRINTING



(A)

ABSTRACT : PROBLEM TO BE SOLVED: To obtain an ink composition for offset printing having excellent setting properties, blocking suitability such as primary and secondary blocking resistances without deteriorating performances required for the offset printing such as gloss of printed surfaces or drying properties in the offset printing.

SOLUTION: This ink composition for the offset printing is characterized as comprising a mixture composed of (1) a colorant, (2) a varnish for offset printing prepared by carrying out thermal reaction of a mixture composed of a binder resin having hydroxy groups and a polyfunctional isocyanate compound as a cross-linking agent or a mixture further composed of a catalyst and (3) at least one kind selected from the group consisting of (I) a fatty acid monoester represented by the chemical formula (A) (wherein, R1 denotes a 5-24C alkyl group; and R2 denotes a 1-10C alkyl group), (II) a diester compound of an aliphatic dibasic acid which is a liquid at normal temperature, has $\geq 150^\circ\text{C}$ boiling point and incompatible with water and (III) an ester compound of an aliphatic diol that is a liquid at normal temperature, has $\geq 150^\circ\text{C}$ boiling point and is incompatible with water in an amount of ≥ 5 wt.% in the solvent component without substantially containing a mineral oil.

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**Delegatura de Propiedad Industrial
División de Nuevas Creaciones**

**REQUISITOS NECESARIOS PARA PRESENTACIÓN Y AGILIZACIÓN DEL
TRAMITE**

PATENTE DE INVENCION ()	MODELO DE UTILIDAD ()	USUARIO ()	RADICADOR ()
-Indicación de que se solicita la concesión de una patente.	()	()	()
-Datos de identificación del solicitante o de la persona que se presenta la solicitud.	()	()	()
-Descripción de la invención.	()	()	()
-Dibujos de ser estos pertinentes.	()	()	()
-Comprobante de Pago de las tasas establecidas.	()	()	()
COMPLETA ()	INCOMPLETA ()	()	()

DISEÑO INDUSTRIAL ()

-Indicación de que se solicita el registro de Diseño Industrial.	()	()
-Datos de identificación del solicitante o de la persona que se presenta la solicitud.	()	()
-Representación gráfica y fotográfica del Diseño Industrial o muestra del Material que incorpora el diseño.	()	()
-Comprobante de Pago de las tasas establecidas.	()	()
COMPLETA ()	INCOMPLETA ()	()

ESQUEMA DE TRAZADO ()

-Indicación de que se solicita el registro de Diseño Industrial.	()	()
-Datos de identificación del solicitante o de la persona que se presenta la solicitud.	()	()
-Representación gráfica del Esquema Trazado.	()	()
-Comprobante de Pago de las tasas establecidas.	()	()
COMPLETA ()	INCOMPLETA ()	()

Firma Responsable:

Fdo B

Fecha:

6 Sep 6

79

REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

Bogotá,
2020

Doctor(a)
RODRIGUEZ DILIA MARIA
Apoderado(a) y/o Representante de
SUN CHEMICAL CORPORATION.

635

REFERENCIA	Radicación No.	6 90329
	Solicitud internacional	PCT/US2005/008504
	Fecha inicio fase nacional	12/10/2006
	Trámite	11
	Evento	378
	Actuación	430
	Oficio No.	

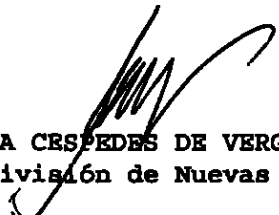
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Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante. (Art. 26-k) Decisión 486.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Unica No.10 de 2001.


ALIX CARMENZA CRESPEDES DE VERGEL
Jefe de la división de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista de
fecha _____
adpa11 17 NOV. 2006