

AVISO DE NOTIFICACION

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CORREO CERTIFICADO

Radicación :00052353 00000006 Fecha: 30/09/2005 8:31:47
Tramite :2 PATENTES DE INVENCION
Evento :1 REGISTRO/DEPOSITO/CONCESION/DEPOSITO
Actuación :432 COMUNICACION ACTO ADMINISTRATIVO
Solicitante :FERRERO EMILIO Folios:1

Bogotá, D.C.

Señor (a) (es)
FERRERO EMILIO
CARRERA 4 NO. 72 - 35
BOGOTA D.C.

REF: RESOLUCION No: 25064
FECHA No. 29/09/2005
EXPEDIENTE No. 0 52353
Tramite :2 PATENTES DE INVENCION
Evento :1 REGISTRO/DEPOSITO/CONCESION/DEPOSITO
Actuación :432 COMUNICACION ACTO ADMINISTRATIVO

P.

Estimado Doctor (a) :

Comendidamente le solicito presentarse a este Despacho ubicado en la Carrera 13 No. 27 - 00 Piso Quinto (5), de la ciudad de Bogotá D.C., dentro del término de cinco (5) días hábiles contados a partir del envío de la presente citación, en horario de 8:30 a.m. a 5:00 p.m. jornada continua, con el fin de notificarle personalmente el contenido de la resolución de la referencia proferida dentro del expediente tramitado con el número de radicación citado en el asunto.

De no hacerse presente en el término indicado anteriormente, la providencia en mención se notificará por edicto, el cual se fijará por el término de diez (10) días en el Centro de Documentación e Información. Para su comodidad el texto completo de la resolución se encontrará disponible en la página web de la Entidad, desde el día hábil siguiente al que se desfije el edicto.

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Secretaría General
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

700

Superintendencia de Industria y Comercio

Otorga la Patente de Invención a:
Petroleo Brasileiro S.A.- Petrobras
Rio de Janeiro, Rio de Janeiro, Brasil

A la Creación denominada:
"Lechadas y composiciones almacenables para cementar pozos de petroleo y gas"

Inventor(es):
Arnaldo Rodrigues D' Almeida
Cristiane Richard de Miranda
Gilson Campos

Certificado No. 28392

Clasificación Internacional: C4B 7/14
de Patentes

19 Reivindicaciones
Vigente Desde: 12/07/2000
Hasta: 12/07/2020

Prioridad No: BR PI 9902726-7 13/07/1999

Que la solicitud de Patente de Invención No 0 52353 cumple con los requisitos previstos en las disposiciones legales vigentes, Resolución No. 25064 de 29/09/2005, en testimonio de ello se estampa la firma del funcionario competente y el sello de esta Entidad.

Superintendente de Industria y Comercio

Family list

9 family members for:

US2002162487

Derived from 5 applications.

[Back to US2002162487](#)**1 Storable compositions and slurries and use of same for cementing oil and gas wells**Inventor: ALMEIDA ARNALDO RODRIGUES D; MIRANDA
CRISTIANE RICHARD DE; (+1)

Applicant: PETROLEO BRASILEIRO SA (BR)

EC: C04B28/08; C09K8/46

IPC: C04B28/08

Publication info: **BR9902726 A** - 2001-03-06**2 Storable compositions and slurries for cementing oil and gas wells**Inventor: D ALMEIDA ARNALDO RODRIGUES (BR); DE
MIRANDA CRISTIANE RICHARD (BR); (+1)

Applicant: PETROLEO BRASILEIRO SA (BR)

EC: C04B28/08; C09K8/46

IPC: C04B28/08; C04B40/06; (+1)

Publication info: **GB0017251D D0** - 2000-08-30**GB2351973 A** - 2001-01-17**GB2351973 B** - 2004-01-07**3 Storable compositions and slurries and use of same for cementing oil and gas wells**Inventor: D ALMEIDA ARNALDO RODRIGUES (BR); MIRANDA
CRISTIANE RICHARD DE (BR); (+1)

Applicant: PETROLEO BRASILEIRO SA (BR)

EC: C04B28/08; C09K8/46

IPC: C09K7/02; C04B7/14; (+1)

Publication info: **NO20003520 A** - 2001-01-15**NO20003520D D0** - 2000-07-07**4 Storable compositions and slurries and use of same for cementing oil and gas wells**Inventor: D ALMEIDA ARNALDO RODRIGUES (BR); DE
MIRANDA CRISTIANE RICHARD (BR); (+1)

Applicant: PETROLEO BRASILEIRO SA (BR)

EC: C04B28/08; C09K8/46

IPC: C04B7/14; C04B7/153

Publication info: **US6613142 B1** - 2003-09-02**5 Storable composition and slurries and use of same for cementing oil and gas wells**Inventor: D ALMEIDA ARNALDO RODRIGUES (BR); DE
MIRANDA CRISTIANE RICHARD (BR); (+1)

Applicant: PETROLEO BRASILEIRO SA (US)

EC: C04B28/08; C09K8/46

IPC: C04B7/14; C04B28/08

Publication info: **US6626242 B2** - 2003-09-30**US2002162487 A1** - 2002-11-07



US006613142B1

(12) **United States Patent**
D'Almeida et al.

(10) **Patent No.:** **US 6,613,142 B1**
(45) **Date of Patent:** **Sep. 2, 2003**

(54) **STORABLE COMPOSITIONS AND
SLURRIES AND USE OF SAME FOR
CEMENTING OIL AND GAS WELLS**

(75) **Inventors:** **Arnaldo Rodrigues D'Almeida**, Rio de Janeiro (BR); **Cristiane Richard De Miranda**, Rio de Janeiro (BR); **Gilson Campos**, Niterói (BR)

(73) **Assignee:** **Petroleo Brasileiro S.A.- Petrobras**, Rio de Janeiro (BR)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/613,724**

(22) **Filed:** **Jul. 11, 2000**

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(51) **Int. Cl.⁷** **C04B 7/14; C04B 7/153**

(52) **U.S. Cl.** **106/789; 106/790**

(58) **Field of Search** **106/789, 790**

(56) **References Cited**

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Primary Examiner—Paul Marcantoni

(74) *Attorney, Agent, or Firm*—Sughrue Mion, PLLC

(57) **ABSTRACT**

Storable compositions and slurries for cementing oil and gas wells are described which comprise blast-furnace slag besides other additives which are usual in the cementing technique. The compositions and slurries are insufficiently activated (or are activated immediately before introducing them into the well), so that they can be stored for at least 72 hours (alternatively they may be stored indefinitely) without the setting of the composition and dispense with the addition of activation inhibitors. The use of the compositions and slurries in the cementing of oil and gas wells is also described.

28 Claims, No Drawings

TABLE 8-continued

	A	B	C	D	E	F	G	H
Water (% by volume)	—	0.283	0.283	0.283	0.283	0.35	0.354	0.324
NaOH (weight % based on the weight of slag)	1	1	1	1	1	2	4	0
Na ₂ CO ₃ (weight % based on the weight of slag)	1.5	2	2	2	2	6	6	1.5
Dispersant lb/bbl	2.5	2	2	2	2	1	1	2
(Kg/m ³)	7.1	5.7	5.7	5.7	5.7	2.9	2.9	5.7
Fluid loss additive (weight % based on the weight of slag)	—	0.78	0.78	0.78	0.78	—	—	1.2
Temperature stabilizer (weight % based on the weight of slag)	—	1.17	1.17	1.17	1.17	—	—	—
Slag lb/bbl	400	300	300	300	300	300	300	350
(Kg/m ³)	1.141	856	856	856	856	856	856	999
Surface area (m ² /Kg)	400	400	582	582	235	400	236	400
Properties								
Compressive psi	960	2,630	1,782	1,782	2,371	1,160	1,282	1,160
Strength ¹ (Mpa)	6.62	18.13	12.29	12.29	16.35	8.00	8.84	8.00
Curing Temperature (° C.)	80	150	150	150	150	80	120	98
Storage Time (days)	20	>50	>59	31	>104	7	7	>27
Storage Temperature (° C.)	22	22	22	35	22	22	22	22

¹Curing period: 24 hours

Formulation of TABLE 9 is formulation F of TABLE 8 without the addition of activators NaOH and Na₂CO₃. Formulation I was kept fluid for more than 67 days. By adding activators after 28 days, the slurry subjected to the curing temperatures of formulation F, 80° C., showed the highest compressive strength, 1,626 psi (11.21 MPa), which is suitable for cementing oil wells.

TABLE 9

I	
Formulation	
Drilling fluid (% by volume)	35
Water(% by volume)	35
NaOH (weight % based on the weight of slag)	—
Na ₂ CO ₃ (weight % based on the weight of slag)	—
Dispersant lb/bbl	1.0
(Kg/m ³)	2.9
Slag lb/bbl	300
(Kg/m ³)	856
Surface area (m ² /Kg)	400
Properties	
Compressive strength ¹ psi	*1,626
(Mpa)	*11.61
Curing Temperature (° C.)	80
Storage Time (days)	>67
Storage Temperature (° C.)	22

¹Curing Period 24 hours

*Assessed after 28 days storage, by adding 2 lb/bbl (5,7 Kg/m³) NaOH and 6 lb/bbl (17,1 Kg/m³) Na₂CO₃.

We claim:

1. A storable composition for cementing oil and gas wells, containing blast-furnace slag as hydraulic material, activators, additives and an aqueous continuous phase forming a cementitious slurry, wherein

the amount of activators in said composition based on the amount of slag is insufficient to effect the setting of the cementitious slurry for at least 72 hours at ambient temperature while providing an effective set time up to 24 hours in a wellbore at the wellbore temperature,

said composition does not include a set inhibitor, and the composition comprises:

- (a) from 200 to 500 lb of blast-furnace slag per each bbl of slurry to be prepared; and
- (b) from 0.01 weight % to 13 weight % of activators, based on the weight of said slag;
- (c) the balance of the composition being made up of an aqueous continuous phase fluid and additives.

2. The storable composition according to claim 1, wherein the setting of said composition is obtained by combining the chemical action of the activators and the thermal action of the temperature of the well bottom.

3. The storable composition according to claim 1, wherein the blast-furnace slag is a by-product from the melting of iron ores.

4. The storable composition according to claim 1, wherein the activator comprises one or more alkali compounds, isolated or in admixture, combined or not with chelating, complexing or sequestering agents.

5. The storable composition according to claim 1, wherein the amount of activator is between 0.1 to 10 weight % based on the weight of slag in the composition.

6. The storable composition according to claim 1, wherein the activator contains a strong base selected from the group consisting of alkaline hydroxides, earth alkaline hydroxides, lithium hydroxide, sodium hydroxide, potassium hydroxide, calcium hydroxide, magnesium hydroxide, and barium hydroxide.

7. The storable composition according to claim 6, wherein the alkali is a sodium hydroxide, potassium hydroxide or a mixture of same, said alkali being present in an amount of 0.01 to 5 weight % based on the amount of slag in the composition.

8. The storable composition according to claim 1, wherein the activator contains a weak base selected from the group consisting of basic carbonates, lithium carbonate, sodium carbonate, potassium carbonate, calcium carbonate, magnesium carbonate, barium carbonate, sodium and potassium carbonate, basic phosphates, sodium pyrophosphate, sodium hexamethaphosphate, tetrasodium polyphosphate, metal salts of citric acid, sodium citrate, calcium citrate, and potassium citrate.

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9. The storable composition according to claim 8, wherein the weak base comprises a carbonate ion.

10. The storable composition according to claim 9, wherein the carbonate ion is a sodium carbonate, a potassium carbonate or a mixture of same, in an amount of 0.01 to 8 weight % based on the weight of slag in the composition.

11. The storable composition according to claim 8, wherein the weak base comprises a phosphate ion.

12. The storable composition according to claim 11, wherein the phosphate ion is a basic phosphate selected from the group consisting of sodium pyrophosphate, sodium hexamethaphosphate and tetrasodium polyphosphate, in an amount between 0.01 and 15 weight % based on the weight of slag.

13. The storable composition according to claim 4, wherein the chelating, sequestering or complexing agents comprise phosphates, citrates, ethylene diamine tetracetic acid and its salts, phosphonic acids and their salts, glutamic acid and its salts in an amount between 0.01% and 15 weight % based on the weight of slag.

14. The storable composition according to claim 1, wherein the aqueous continuous phase fluid comprises a fluid where the continuous phase comprises ordinary fresh water, brine, or sea water, isolated or in admixture, or any other aqueous drilling fluid.

15. A cementitious slurry useful for cementing oil and gas wells the composition of which is according to claim 1, wherein the slurry is prepared by admixing the constituents in a tank provided with mechanical and/or hydraulic circulation agitators, the solid constituents being added on the mixture of aqueous continuous phase fluids, one at a time, during a sufficient time so that said solids are dispersed or dissolved in the liquid phase, the slurry being kept fluid for at least 72 hours at ambient temperature.

16. The storable composition according to claim 5, wherein the amount of activator is between 1.5 and 4.5 weight % based on the weight of slag in the composition.

17. The storable composition according to claim 6, wherein the alkali is a sodium hydroxide, potassium hydroxide or a mixture of same, said alkali being present in an amount of between 0.5 and 4 weight % based on the amount of the slag in the composition.

18. The storable composition according to claim 6, wherein the alkali is a sodium hydroxide, potassium hydroxide or a mixture of same, said alkali being present in an amount of between 1 and 2 weight % based on the amount of the slag in the composition.

19. The storable composition according to claim 9, wherein the carbonate ion is a sodium carbonate, a potassium carbonate or a mixture of same, in an amount of

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between 0.5 and 2.5 weight % based on the weight of slag in the composition.

20. The storable composition according to claim 9, wherein the carbonate ion is a sodium carbonate, a potassium carbonate or a mixture of same, in an amount of between 1.5 and 2.5 weight % based on the weight of slag in the composition.

21. The storable composition according to claim 11, wherein the phosphate ion is a basic phosphate selected from the group consisting of sodium pyrophosphate, sodium hexamethaphosphate and tetrasodium polyphosphate, in an amount between 0.5 and 8.0 weight % based on the weight of slag.

22. The storable composition according to claim 4, wherein the chelating, sequestering or complexing agents comprise phosphates, citrates, ethylene diamine tetracetic acid and its salts, phosphonic acids and their salts, glutamic acid and its salts in an amount between 0.5% and 8 weight % based on the weight of slag.

23. A cementitious slurry useful for cementing oil and gas wells according to claim 15, wherein the effective amount of activator is added immediately before the slurry is being pumped into the well while providing an effective set time up to 24 hours in the wellbore.

24. A cementitious slurry useful for cementing oil and gas wells according to claim 15, wherein the effective amount of activator is added in two partition steps, a sufficient amount to keep the storable slurry composition suspended at ambient temperature and a complement amount immediately before the slurry is being pumped into the well while providing an effective set time up to 24 hours in the wellbore.

25. The storable composition of claim 1, wherein the activators comprise a base or mixture of bases selected from the group consisting of lithium hydroxide, sodium hydroxide, potassium hydroxide, calcium hydroxide, magnesium hydroxide, barium hydroxide, lithium carbonate, sodium carbonate, potassium carbonate, calcium carbonate, magnesium carbonate, barium carbonate, sodium and potassium carbonate, sodium pyrophosphate, sodium hexamethaphosphate and tetrasodium polyphosphate.

26. The storable composition of claim 25, wherein the activators are sodium hydroxide and sodium carbonate.

27. The storable composition of claim 1, wherein the additives are selected from the group consisting of extenders, strength retrogression controllers, accelerators, fluid loss additives, dispersants and weighting agents.

28. The storable composition of claim 27, wherein the additives are selected from the group consisting of a dispersant, a fluid loss additive, and a temperature stabilizer.

* * * * *

O-52353.

(12) **UK Patent Application** (19) **GB** (11) **2 351 973** (13) **A**

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(33) BR

(71) Applicant(s)

Petróleo Brasileiro S.A. - Petrobras
(Incorporated in Brazil)
Avenida República do Chile no 65, Rio de Janeiro (RJ),
20035-900, Brazil

(72) Inventor(s)

Arnaldo Rodrigues D'Almeida
Cristiane Richard de Miranda
Gilson Campos

(74) Agent and/or Address for Service

J A Kemp & Co.
14 South Square, Gray's Inn, LONDON, WC1R 5LX,
United Kingdom

(51) INT CL⁷

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H733 H734 H737 H738 H739 H740 H747 H752 H757
H758 H767 H783 H785 H794 H811
U1S S1761

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(58) Field of Search

UK CL (Edition R) C1H HCH HPH
INT CL⁷ C04B 28/08 40/06 , C09K 7/02 , E21B 33/13
33/14
ONLINE: EPODOC, JAPIO, WPI

(54) Abstract Title

Storable compositions and slurries for cementing oil and gas wells

(57) Storable compositions and slurries for cementing oil and gas wells comprise blast-furnace slag besides other additives which are usual in the cementing technique. The composition and slurries are insufficiently activated (or are activated immediately before introducing them into the well), so that they can be stored for at least 72 hours (alternatively they may be stored indefinitely) without the setting of the composition and dispense with the addition of activation inhibitors.

GB 2 351 973 A



INVESTOR IN PEOPLE

Application No: GB 0017251.0
Claims searched: 1 to 20

Examiner: Miss M M Kelman
Date of search: 25 September 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.R): C1H HCH HPH
Int Cl (Ed.7): C04B 28/08, 40/06; C09K 7/02; E21B 33/13, 33/14
Other: ONLINE: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	US 5547506 A RAE <u>et al</u> see the claims, column 3, lines 38 to 64, column 5, lines 60 to 65, and Tables 1 and 2	1,3,5,15,16,18,19 and 20 at least
X	US 5409064 A COWAN see the claims and Examples	19 and 20
X	US 5058679 A HALE <u>et al</u> see Tables 6 and 8	1,4,5,15,16,18,19 and 20, at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.