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**Datasheet for the decision
of 28 May 2019**

Case Number: T 2377/16 - 3.3.05

Application Number: 10184803.4

Publication Number: 2314555

IPC: C04B14/04, C09K8/46

Language of the proceedings: EN

Title of invention:
Zeolite-containing cement composition

Applicant:
Halliburton Energy Services Inc.

Headword:
Cement with zeolite/Halliburton

Relevant legal provisions:
RPBA Art. 13(1)
EPC Art. 123(2), 76(1), 84, 56

Keyword:
Late filed request - clearly allowable (yes)
Amendments - allowable (yes)
Claims - clarity (yes)
Inventive step - (yes)

Decisions cited:

T 1170/02, T 0956/07, T 2017/07, T 0759/10

Catchword:



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Case Number: T 2377/16 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 28 May 2019

Appellant: Halliburton Energy Services Inc.
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Houston, Texas 77032 (US)

Representative: Turner, Craig Robert
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 19 May 2016
refusing European patent application No.
10184803.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman E. Bendl
Members: G. Glod
R. Winkelhofer

Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division to refuse European patent application No. EP 10 184 803.4.

The examining division was of the opinion that claim 1 of the then sole request was an obvious alternative in view of

D1: WO 01/70646 A1.

- II. With the statement of grounds of appeal, the appellant submitted a new main request and first to fifth auxiliary requests, and mentioned further sixth to eleventh auxiliary requests without providing them in electronic/paper form.
- III. By submission of 29 April 2019, the appellant filed a new main request and first to thirteenth auxiliary requests.
- IV. On 22 May 2019 the appellant submitted amended auxiliary requests 6 and 7 and a new fourteenth auxiliary request.
- V. Oral proceedings took place on 28 May 2019. The appellant filed a new main request and withdrew all the other requests.

The only independent claim of this sole request is as follows:

"1. A method of sealing a subterranean zone penetrated by a wellbore, which method comprises cementing the zone with a cement composition consisting of zeolite,

cementitious material, and water, wherein the cementitious material is Portland cement, pozzolan cement, gypsum cement, aluminous cement, silica cement, or alkaline cement; and an accelerating additive present in an amount of from 0.5% to 10% by weight of the cement, wherein the zeolite is present in the composition in an amount of from 50% to 75%, by weight of the cement, and wherein the water is present in an amount of from 100% to 200% by weight of the cement."

Claims 2 and 3 relate to preferred embodiments of claim 1.

VI. The arguments of the appellant are reflected in the reasoning below.

VII. The appellant requests that the impugned decision be set aside and that a patent be granted on the basis of the main and sole request submitted during the oral proceedings on 28 May 2019.

Reasons for the Decision

1. Article 13(1) RPBA

Although the request was only submitted during the oral proceedings before the board, it was admitted into the proceedings because it was a restriction of previously filed requests leading to a clearly allowable request for the reasons provided below.

2. Article 123(2) EPC

Claim 1 is based on claims 1 and 4 to 7 in combination with the last three lines on page 1 of the application as filed.

The replacement of "comprising" by "consisting of" is allowable in view of Table 5, which shows that slurries according to batches 2 to 5 containing water, cement, zeolite and an accelerating additive in the claimed ranges have the best compressive strength. The skilled person understands therefrom that these compositions are the most preferred. This is not contrary to T 2017/07 (point 4 of the Reasons) since in that case the amendment led to a composition that was in contradiction to the examples, which did not make technical sense. T 759/10 and the decisions cited therein (Reasons 5) are not of relevance, since they concern the amendment from "comprising" to "consisting essentially of".

The range 100% to 200% for water is a combination of the ranges 22% to 200% and 40% to 100% disclosed in claim 6 of the application as filed. In line with T 1170/02 (Reasons 4.5.2) and T 956/07 (Reasons 5.1), the exclusion of the most preferred range in the present case is consistent with the teaching of example 5 (Table 5) and is considered directly and unambiguously derivable from the application as filed.

Claims 2 and 3 are based on claims 7 and 8 of the application as filed respectively.

Therefore the requirements of Article 123(2) EPC are met.

3. Article 76(1) EPC

Claim 1 is based on claims 1, 5 to 8 and 12 of the parent application (EP 1 428 805 A1). In addition the comments made for Article 123(2) EPC apply.

Claim 2 is based on claims 8 and 12 while claim 3 is based on claims 9 and 12 of the parent application.

Therefore, the requirements of Article 76(1) EPC are met.

4. Article 84 EPC

The cement composition for the method according to claim 1 is now restricted to four components. Although the amount of cement is not defined, and consequently the absolute amount of the other additives (zeolite, water and the accelerating additive) is not defined either, it is clear to the skilled person that cement is now the only binder present in the composition, so it has to be present in considerable amounts.

The previous clarity objection based on the term "comprising" has been overcome.

The requirements of Article 84 EPC are met.

5. Article 54 EPC

The board shares the considerations concerning novelty of the claimed subject-matter as expressed in the decision under appeal.

6. Article 56 EPC
- 6.1 The invention relates to a method for sealing a subterranean zone with a cement composition.
- 6.2 D1 is considered the closest prior art, since it also relates to the cementing of oil wells.
- 6.3 The problem to be solved is to provide an alternative method retaining high compressive strength (see patent application, page 2, last line to page 3, line 6).
- 6.4 The problem is solved by the method according to claim 1, characterised in that the cementing is done with a composition consisting of zeolite, cementitious material, water and an accelerating additive, wherein the zeolite is present in an amount of from 50% to 75% by weight of the cement.
- 6.5 The appellant has demonstrated that the problem is solved, since Table 4 shows that, even without an accelerating additive, the zeolite cement delivers results similar to conventional silica slurries. The early compressive strength development is similar to conventional fumed silica slurries. Independently from some deviations of the results of Type 3 in Table 4 from those of Batch 1 in Table 5, which appear to relate to identical samples, it is nevertheless acknowledged that a composition with an accelerating additive, as claimed, has an increased compressive strength (see results of Table 5).
- 6.6 It needs to be established whether the proposed solution is obvious or not.

D1 discloses in Figure 1 a ternary Si-Al-Ca diagram. Some of the mineral phases are zeolites (see also Table 1). The goal is to have junctions between minerals which allow the xonotlite to disappear while avoiding the formation of garnets, which have proved to be unstable (page 4, lines 25 to 29). Starting from Portland cement, the composition has to be enriched with alumina and silica to place it in the favourable regions (page 5, lines 10 to 16). The compositions comprised 30% to 80% of micro-alumina and 75% to 85% of silica, or silica and alumina, in the form of silica/alumina microspheres (see page 6, lines 16 to 20 and Table 3). All of the proposed formulations contained dispersing agents to obtain a slurry with a rheology compatible with pumping in a subterranean well (page 6, lines 13 to 15). A mineralogical analysis showed that zeolite was formed in the reacted slurry (see Table 7).

Although the skilled person might consider the addition of zeolite to the cements as an option to adapt the amount of alumina and silica such that it is in the desired region (see impugned decision, Reasons 3.5), D1 does not contain any teaching that a composition consisting of only cement, zeolite, water and an accelerating additive in the claimed ranges is a decent alternative to the compositions shown in Table 3 of D1. In particular, there is no reason for adding zeolites in an amount of 50% to 75% by weight of cement and to remove the dispersing agent, since the dispersing agent is presented as essential for obtaining the desired rheology. There is no indication that silica and alumina could be replaced by high amounts of zeolite while retaining good compressive strength. To argue that the restricted composition for the method of claim 1 was obvious in view of the teaching of D1 is based on hindsight.

Therefore, the solution of the problem is not obvious in view of D1 alone.

The other documents cited before the examining division and disclosing zeolite do not relate to the sealing of a subterranean zone penetrated by a wellbore and do not disclose 50% to 75% zeolite by weight of cement (see impugned decision, Reasons 16.2.2). Therefore, they are not relevant for the solution of the posed problem.

6.7 Consequently, the requirements of Article 56 EPC are met.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the main (sole) request, submitted in the oral proceedings of 28 May 2019, and the description to be adapted.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated