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**Datasheet for the decision
of 22 February 2016**

Case Number: T 2273/12 - 3.3.10

Application Number: 06739160.7

Publication Number: 1861348

IPC: C07C51/265, B01D3/00, B01D3/14,
C07C63/15, C07C63/00

Language of the proceedings: EN

Title of invention:

PROCESS AND APPARATUS FOR MANUFACTURING PURE FORMS OF AROMATIC
CARBOXYLIC ACIDS

Patent Proprietor:

BP Corporation North America Inc.

Opponent:

INVISTA Technologies S.à.r.l.

Headword:

PROCESS FOR MANUFACTURING AROMATIC CARBOXYLIC ACIDS/BP

Relevant legal provisions:

EPC Art. 100(c), 123(2), 123(3)

Keyword:

Main request and auxiliary requests 1 to 14: subject-matter extends beyond the content of the application as filed (yes)
Auxiliary requests 15 to 20: Amendments - broadening of the scope of the claims as granted (yes)

Decisions cited:

T 0860/00

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 2273/12 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 22 February 2016

Appellant: BP Corporation North America Inc.
(Patent Proprietor) 4101 Winfield Road
Warrenville, IL 60555 (US)

Representative: Hamer, Christopher K.
Mathys & Squire LLP
The Shard
32 London Bridge Street
London SE1 9SG (GB)

Appellant: INVISTA Technologies S.à.r.l.
(Opponent) Zweigniederlassung St. Gallen
Pestalozzistrasse 2
9000 St. Gallen (CH)

Representative: Cockerton, Bruce Roger
Carpmaels & Ransford LLP
One Southampton Row
London WC1B 5HA (GB)

Decision under appeal: **Interlocutory decision of the Opposition**
Division of the European Patent Office posted on
16 August 2012 concerning maintenance of the
European Patent No. 1861348 in amended form.

Composition of the Board:

Chairman P. Gryczka
Members: J.-C. Schmid
T. Bokor

Summary of Facts and Submissions

- I. The Appellant I (opponent) and Appellant II (proprietor of the patent) lodged appeals against the interlocutory decision of the Opposition Division which found that the European patent No. 1 861 348 in amended form met the requirements of the EPC.

- II. In its notice of opposition the Appellant I requested revocation of the patent-in-suit in its entirety on the grounds of lack of novelty and inventive step (Article 100(a) EPC), insufficient disclosure (Article 100(b) EPC), and extension of the subject-matter of the patent-in-suit beyond the content of the application as filed (Article 100(c) EPC).

- III. According to the Opposition Division the passage on page 28, line 3 to 13 of the application as filed, disclosed that a high pressure gas leaving the separation zone was condensed directly to give a condensate liquid comprising water and being substantially free of organic impurities. The term "directly" clearly implied that no treatment at all of the high pressure gas took place between the separation zone and the condensing zone. Accordingly, the feature "without treatment to remove organic impurities" present in claim 1 of the patent as granted was supported by the application as filed. Consequently, the subject-matter of the patent-in-suit did not extend beyond the content of the application as filed (Article 100(c) EPC).

- IV. At the oral proceedings before the Board, held on 22 February 2016, the Appellant II defended the maintenance of the patent-in-suit in amended form based on the claims according to a main and twenty auxiliary

requests, all requests filed with a letter dated 22 January 2016.

Claim 1 of the main request reads as follows:

"1. A process for manufacture of aromatic carboxylic acid comprising contacting a feed material comprising at least one aromatic hydrocarbon substituted at one or more positions with at least one group that is oxidizable to a carboxylic acid group with gaseous oxygen in a liquid phase oxidation reaction mixture comprising monocarboxylic acid solvent and water and in the presence of a catalyst composition comprising at least one heavy metal component in a reaction zone at elevated temperature and pressure effective to maintain a liquid phase oxidation reaction mixture and form an aromatic carboxylic acid and impurities comprising oxidation by-products of the substituted aromatic hydrocarbon dissolved or suspended in the liquid phase and a high pressure vapor phase comprising solvent monocarboxylic acid, water and minor amounts of the substituted aromatic hydrocarbon and by-products;

transferring a high pressure vapor phase removed from the reaction zone to a separation zone supplied with liquid reflux comprising water and capable of substantially separating monocarboxylic acid solvent and water in the high pressure vapor phase to form a solvent monocarboxylic acid-rich, water lean liquid and a high pressure gas comprising water vapor;

transferring a high pressure gas comprising water vapor removed from the separation zone to a condensing zone **without treatment to remove organic** impurities and condensing the high pressure gas to form a condensate liquid comprising water and substantially free of

organic impurities and a condensing zone exhaust gas under pressure comprising incondensable components of the high pressure gas transferred to the condensing zone **without treatment to remove organic impurities;**

recovering from the condensing zone condensate liquid that comprises water substantially free of organic impurities and is suitable without additional treatment for use as at least one liquid comprising water in a process for purification of aromatic carboxylic acids;

and directing condensate liquid comprising water substantially free of organic impurities recovered from the condensing zone to a process for purification of aromatic carboxylic acid, which comprises:

- (a) forming a purification reaction solution comprising aromatic carboxylic acid and impurities dissolved or slurried in a liquid comprising water;
- (b) contacting a purification reaction solution comprising aromatic carboxylic acid and impurities in a liquid comprising water at elevated temperature and pressure with hydrogen in the presence of a hydrogenation catalyst to form a purification liquid reaction mixture;
- (c) recovering solid purified product comprising aromatic carboxylic acid with reduced levels of impurities from a purification liquid reaction mixture comprising the aromatic carboxylic acid and impurities in a liquid comprising water;
- (d) washing with at least one liquid comprising water a solid purified aromatic carboxylic acid product

recovered from a purification liquid reaction mixture comprising the aromatic carboxylic acid, impurities and a liquid comprising water; and

- (e) directing a purification mother liquor from which solid purified product comprising aromatic carboxylic acid with reduced levels of impurities is recovered in step (c) to the separation zone such that reflux liquid to the separation comprises the purification mother liquor;

such that a liquid comprising water in at least one step of the purification process comprises the condensate liquid comprising water substantially free of organic impurities."

The process of claim 1 of auxiliary requests 1 to 6, 11 and 12 also comprises the feature "transferring a high pressure gas comprising water vapor removed from the separation zone to a condensing zone **without treatment to remove organic impurities** and condensing the high pressure gas to form a condensate liquid comprising water and substantially free of organic impurities and a condensing zone exhaust gas under pressure comprising incondensable components of the high pressure gas transferred to the condensing zone **without treatment to remove organic impurities**".

In claim 1 of auxiliary requests 7 to 10, 13 and 14, this feature has been amended into "transferring a high pressure gas comprising water vapor removed from the separation zone **directly** to a condensing zone and condensing the high pressure gas to form a condensate liquid comprising water and substantially free of organic impurities and a condensing zone exhaust gas under pressure comprising incondensable components of

the high pressure gas transferred **directly** to the condensing zone".

Claim 1 of auxiliary request 15 reads as follows:

"1. A process for manufacture of aromatic carboxylic acid comprising, in steps,

at least one liquid phase oxidation step comprising contacting a feed material comprising at least one substituted aromatic hydrocarbon in which the substituents are oxidizable to carboxylic acid groups with gaseous oxygen in a liquid phase oxidation reaction mixture comprising monocarboxylic acid solvent and water and in the presence of a catalyst composition comprising at least one heavy metal component in a reaction zone at elevated temperature and pressure effective to maintain a liquid phase oxidation reaction mixture and form an aromatic carboxylic acid and impurities comprising reaction by-products dissolved or suspended in the liquid phase oxidation reaction mixture and a high pressure vapor phase comprising water, monocarboxylic acid, unreacted substituted aromatic hydrocarbon, oxygen and reaction by-products; and

at least one purification step comprising contacting with hydrogen at elevated temperature and pressure in the presence of a catalyst comprising a hydrogenation catalyst metal a purification reaction solution comprising a liquid that comprises water and has dissolved therein aromatic carboxylic acid and impurities recovered from the liquid phase oxidation reaction mixture from at least one liquid phase oxidation step to form a purification liquid reaction mixture comprising the aromatic carboxylic acid and

hydrogenated impurities dissolved in a liquid comprising water; and

at least one off-gas treatment step comprising substantially separating solvent monocarboxylic acid and water in a high pressure vapor phase removed from the reaction zone in at least one liquid phase oxidation step to form a liquid comprising solvent monocarboxylic acid and a high pressure gas comprising water, unreacted feed material, reaction by-products, oxygen and a minor amount of solvent monocarboxylic acid and condensing directly from the high pressure gas a condensate liquid comprising water and substantially free of organic impurities; and

at least one step comprising directing a condensate liquid comprising water and substantially free of organic impurities condensed directly from the high pressure gas in at least one off-gas treatment step to at least one purification step such that a liquid comprising water in the purification step comprises the condensate liquid,

wherein at least one off-gas treatment step comprising substantially separating solvent monocarboxylic acid and water in a high pressure vapor phase removed from the reaction zone in at least one liquid phase oxidation step in a separation device supplied with a reflux liquid comprising a purification mother liquor from which aromatic carboxylic acid with reduced levels of impurities is recovered in at least one purification step."

The "at least one gas off-gas treatment step" of claim 1 of auxiliary requests 16 to 20 also comprises the feature of "condensing directly from the high pressure

gas a condensate liquid comprising water and substantially free of organic impurities".

- V. According to Appellant I there was no basis in the application as filed for the feature "without treatment to remove organic impurities" present in claim 1 as granted. The wording "without treatment to remove organic impurities" did not appear anywhere in the application as filed. The passage of page 28, lines 3 to 13 quoted by the opposition division did not relate to the transfer of the high pressure gas from a separation means to a condensing means, but related to the condensing step as such, i.e. once the high pressure gas had reached the condensing means. Furthermore, the term "condensing directly" could not support specifically excluding organic treatment while permitting other treatments.

In claim 1 of auxiliary requests 7 to 10, 13 and 14, the wording "without treatment to remove organic impurities" had been replaced by "directly". Transferring a high pressure gas removed from the separation zone directly to a condensing zone meant that the condensing means were mounted directly or in close association with the separation device, and not as alleged by Appellant II, that no treatment took place between the separation zone and the condensing zone. Therefore the scope of protection of claim 1 of these requests had been shifted with respect to that of the claims as granted, contrary to the requirement of Article 123(3) EPC. Furthermore, this amendment was not based on the content of application as filed, so that the requirements of Article 123(2) EPC were also not satisfied.

Claim 1 of auxiliary requests 15 to 20 encompassed a process comprising the step of condensing a condensate liquid directly from the high pressure gas with a treatment to remove organic impurities, which process was not covered by the scope of the claims as granted. Claim 1 of these requests had been amended in such a way as to extend the protection conferred, contrary to the requirements of Article 123(3) EPC.

VI. According to Appellant II, the requirement "without treatment to remove organic impurities" present in the step of transferring a high pressure gas from the separation zone to the condensation zone in the process of claim 1 according to the main and auxiliary requests 1 to 6, 11 and 12, although not being explicitly disclosed in the application as filed, could nevertheless be deduced from its context. Figures 1 and 2 interpreted in the light of the whole content of the application as filed also provided a basis for the contested feature, since it was clear that no treatment to remove organic impurities took place between the separator and the condensing means. The figure in the application as filed clearly showed that the high pressure gas was passed directly from the distillation column to the condensing means. The finding of the invention was that the aqueous condensate liquid was substantially free of organic impurities and could be used without additional treatment or purification in further steps of the process. It was disclosed that the exhaust gas after condensation can comprise incondensable components from the liquid phase oxidation off-gas including organic material. Therefore, it was implicit that the organic impurities were not removed from the high pressure gas prior condensation. In auxiliary requests 7 to 10, 13 and 14 the requirement that the high pressure gas is

transferred to the condensing zone without treatment to remove organic impurities had been replaced by the requirement that the high pressure gas is transferred directly to the condensing zone. That meant that there was no treatment of the high pressure gas to remove organic impurities. The requirements of Article 123(3) EPC were therefore satisfied. This modification was based on page 28, line 10 and on page 34, line 25 and on figures 1 and 2 of the application as filed, where it was clearly shown that the high pressure gas was passed directly from the distillation column to the condensing means. The requirements of Article 123(2) EPC were also satisfied.

Claim 1 of auxiliary requests 15 to 20 was derived from claim 17 as granted. The feature "without treatment to remove organic impurities" required in the process of claim 17 as granted did not apply to the transfer of the high pressure gas from the separation zone to the condensing zone, but applied to the condensing step. This feature was therefore not a limitative feature since no active treatment to remove organic impurities could be carried out during the condensation step. Consequently, as the deleted feature was superfluous, claim 1 of auxiliary requests 15 to 20 fulfilled the requirements of Article 123(3) EPC.

VII. Appellant II requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or, subsidiarily, on the basis of any of the auxiliary requests 1 to 20, all requests filed with a letter dated 22 January 2016.

Appellant II requested that the decision under appeal be set aside and the patent be revoked.

VIII. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

1. The appeals are admissible.

Main request and auxiliary requests 1 to 6, 11 and 12

2. *Amendments (Article 100(c) EPC)*

2.1 The patent in suit has been opposed inter alia on the ground that the subject-matter of the patent extended beyond the content of the application as filed (Article 100(c) EPC).

The feature "without treatment to remove organic impurities" in granted claim 1, i.e. that the high pressure gas removed from the separation zone is transferred to the condensing zone without treatment to remove organic impurities, was objected to by Appellant I for having no basis in the application as filed.

This feature appears in claim 1 of the main request and in claim 1 of auxiliary requests 1 to 6, 11 and 12.

2.2 In order to determine whether or not an amendment adds subject-matter extending beyond the content of the application as filed it has to be examined whether technical information has been introduced which a skilled person would not have directly and unambiguously derived from the application as filed, either explicitly or implicitly.

- 2.3 It is not disputed that the contested feature "without any treatment to remove organic impurities" is not explicitly disclosed in the application as filed.

The contested amendment actually relates to a negative technical feature which excludes specifically treatments to remove organic impurities during the transfer of the high pressure gas to the condensing means. It was incorporated into claim 1 during the examining proceedings in reply to a communication of the Examining Division objecting to lack of novelty with respect to a prior art document.

- 2.4 In the decision under appeal, the Opposition Division found that the section on page 28, lines 3 to 13, more specifically lines 9 to 13, formed the basis for this amendment in the application as filed. This section reads "condensing directly from the high pressure gas a condensate liquid comprising water and substantially free of organic impurities, such as solvent monocarboxylic, unreacted aromatic feed material to liquid phase oxidation and oxidation by-products of the feed material."

It must therefore be noted that this section does not deal with the step of transferring the high pressure gas to the condensing means, but indicates that the condensate liquid is directly condensed from the high pressure gas, i.e. once it has reached the condensing means. Hence this section does not give any basis for excluding any type of treatment between the separation means and the condensing means, let alone for excluding specifically a treatment to remove organic impurities.

- 2.5 According to Appellant II, figures 1 and 2 interpreted in the light of the whole content of the application as

filed provided a basis for the contested amendment, since it was clearly shown that the high pressure gas is passed directly from the distillation column to the condensing means, as also explained at pages 61 to 63 of the application as filed, indicating that no treatment to remove organic impurities took place between the separator and the condensing means.

However figures 1 and 2 are schematic illustrations of the claimed process. They cannot provide a proper basis for a negative feature, also in combination with the brief explanations at pages 61 to 63 of the application as filed. At page 62, lines 13 to 21 it stated that the separation device of the apparatus is in flow communication with condensing means and that the condensing means is adapted to receive a gas stream comprising high pressure gas removed from the separation device. Similar disclosure is found at page 63, lines 16 to 18 where it is said that the separation device is in fluid communications with condensing means via vent 38 and associated transfer lines. However, these disclosures of the application as filed do not provide any basis for excluding any treatment between the separation means and the condensing means, let alone for specifically excluding a treatment to remove organic impurities.

2.6 Throughout the application as filed there are disclosures that the aqueous condensate liquid is substantially free of organic impurities (page 28, lines 10 to 13, page 44, lines 15 to page 45, line 5), this being an important finding of the invention (page 5, lines 1 to 14). It is also disclosed that the condensate liquid surprisingly can be used without additional treatment or purification in further steps of the process (page 45, lines 6 to 11). There is also

a disclosure that the exhaust gas after condensation can comprise incondensable components from the liquid phase oxidation off-gas including organic material (page 39, line 7 to 14).

According to Appellant II these passages provided an implicit disclosure that there was no treatment to remove organic impurities beforehand, otherwise the invention would be deprived from its sense.

However, an implicit disclosure is a disclosure which any person skilled in the art would objectively consider as necessarily implied in the explicit content, e.g. in view of general scientific laws (T 860/00, point 1.1 of the reasons; not published in OJ EPO). Hence, an implicit disclosure should not be construed to mean matter that does form part of the content of the technical information provided by a document but may be rendered obvious on the basis of that content.

The Appellant II's arguments are not based on the disclosure of the application as filed, but fall back upon considerations which should only be taken into account when assessing inventive step. The requirement for the allowability of an amendment under Article 123(2) EPC is that the amendment must be directly and unambiguously derivable from the application as filed. Thus, the Appellant II's arguments are devoid of merit when assessing the allowability of the amendment under Article 123(2) EPC.

2.7 The Board comes therefore to the conclusion that specifying that no treatment to remove organic impurities is carried out in the transfer from the separation zone to the condensing zone without

treatment to remove organic impurities provides the skilled person with technical information, which is not directly and unambiguously derivable from the application as filed.

- 2.8 Thus, the application as filed does not provide a proper basis for claim 1 as granted. For these reasons, the Board concludes that claim 1 of the main and auxiliary requests 1 to 6, 11 and 12 extends the subject-matter claimed beyond the content of the application as filed thus justifying the ground for opposition pursuant to Article 100(c) EPC.

Auxiliary requests 7 to 10, 13 and 14

3. *Amendments (Article 123(2), (3) EPC)*

- 3.1 claim 1 of these requests have been amended in that the feature "transferring a high pressure gas comprising water vapor removed from the separation zone to a condensing zone without treatment to remove organic impurities" has been replaced by the feature "transferring a high pressure gas comprising water vapor removed from the separation zone directly to a condensing zone".

3.2 *Interpretation of "directly"*

The Appellants were divided as to the interpretation of the contested amendment of claim 1.

According to Appellant I, the contested amendment meant that the condensing zone was directly connected to the separation zone, while according to Appellant II, the modified feature meant that the transfer of the high

pressure gas from the separation zone to the condensing zone occurred without any treatment at all.

On page 29, line 8 to 13 of the application as filed there is an explanation of what is meant by transferring a gas from the reaction zone to the separation zone, directly or indirectly.

Although this section of the application as filed deals with the step of transferring the gas from the reaction zone to the separation zone, i.e. the step beforehand in the claimed process, it nevertheless clarifies what is meant in the context of the patent-in-suit by transferring a gas from a zone to another zone, directly or indirectly.

Thus, this section discloses that the high pressure vapor phase can be transferred from the reaction zone to the separation zone directly or indirectly and that directly means that the separation device is mounted directly or in close association with the reaction zone while "indirectly" allows suitable conduits, valves, pumps and the like.

Accordingly, the feature "transferring a high pressure gas comprising water vapor removed from the separation zone **directly** to a condensing zone" should be interpreted in the context of the patent-in-suit as requiring that the condensing devices are mounted directly onto or in close association with the separation device.

3.3 According to appellant II, the contested amendment was based on page 28, line 10 and on page 34, line 25 and on figures 1 and 2 of the application as filed, where it was clearly shown that the high pressure gas is

passed directly from the distillation column (30) to the condensing means (50).

- 3.4 However, the section of page 28, line 10 relates to the condensation step and thus cannot provide a basis for a feature pertaining to the step of transferring a high pressure gas comprising water vapor removed from the separation zone to a condensing zone (see point 2.4 above).

Page 34, line 25 to 30 mentioned by the Appellant II discloses that the high pressure gas removed from the separation zone is directed continuously to a condensing zone. The term "continuously" means that the process is operated in a continuous mode, as opposed to the batch mode, and therefore is not tantamount to "directly". This section cannot provide a basis for the amended feature.

Figures 1 and 2 interpreted in the light of the description also do not provide a basis for the amended feature.

As explained on page 63, lines 16 to 18, Figure 1 shows that the separation device represented by distillation column 30 is in fluid communication via vent 38 and associated transfer lines, as at 39, with condensing means 50. Figure 2 has the same disclosure as figure 1 in this respect.

Accordingly, figure 1 and 2 show that the separation zone is indirectly connected to the separation zone, and thus do not provide a basis for the contested modification.

Even if the Appellant II's interpretation were followed, i.e. if "directly" meant that no treatment at all occurred during the transfer, then figures 1 and 2 would still not provide a basis for the contested feature (see point 2.4 above).

Therefore the Board comes to the conclusion that there is no basis for the contested amendment in the application as filed. Furthermore, the scope of claim 1 has been shifted, since amended claim 1 no longer excluded the treatments to remove organic impurities. Accordingly, amended claim 1 of auxiliary requests 7 to 10, 13 and 14 infringes both the requirements of Article 123(2) and (3) EPC.

Auxiliary requests 15 to 20

4. *Amendments: extension of the scope of protection:
Article 123(3) EPC*

4.1 Article 123(3) EPC provides that the claims of a patent as granted may not be amended during opposition/appeal proceedings in such a way as to extend the protection conferred. In order to decide whether or not an amendment of the patent in suit satisfies this requirement, it is necessary to compare the protection conferred by the claims as granted, with that of the claims after amendment. Claim 1 of auxiliary requests 15 to 20 is based on independent claim 17 as granted.

4.2 *Scope of claim 17 as granted*

The process of claim 17 as granted comprises at least one off-gas treatment step comprising condensing directly from the high pressure gas **without treatment to remove organic impurities** a condensate liquid

comprising water and substantially free of organic impurities.

The process of claim 17 therefore requires that there is no treatment to remove organic impurities during the step of condensing the high pressure gas.

4.3 Scope of claim 1 of auxiliary requests 15 to 20

The process of claim 1 of auxiliary request 15 to 20 does not require that the condensate liquid is condensate from the high pressure gas without treatment to remove organic impurities. Claim 1 of auxiliary requests 15 to 20 therefore encompasses a process comprising a step of condensing directly from the high pressure gas **with a treatment to remove organic impurities** a condensate liquid comprising water and substantially free of organic impurities, which process was not covered by the scope of claim 17 as granted.

4.4 Accordingly, claim 1 of auxiliary requests 1 to 15 has been amended in such a way as to extend the protection conferred (Article 123(3) EPC).

4.5 According to the Appellant II, the proviso "without treatment to remove organic impurities" was not a limitative feature in claim 17 as granted, since no active treatment to remove organic impurities could be carried out during the condensation step.

However the scope of claim 17 as granted should be interpreted from its wording as it stands. Claim 17 specifically stipulates that the condensation step occurs **without** treatment to remove organic impurities, this means *a contrario* that a condensation of the high pressure gas **with** treatment to remove organic

impurities can be foreseen. For instance, as pointed out by Appellant I it may be possible to envisage a treatment to remove organic impurity during condensation, such as by adjusting the temperature and the pressure in order to monitor removal of organic impurities. This interpretation of claim 17 as granted is also in line with the fact that the contested proviso has been introduced into the claim during the examination proceedings just in order to delimit the claimed subject-matter from the prior art. Consequently, the Appellant II's argument is rejected.

4.6 The Board comes therefore to the conclusion that claim 1 of auxiliary requests 15 to 20 does not fulfil the requirement of Article 123(3) EPC.

5. Since none of the requests is allowable the patent must be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



C. Rodríguez Rodríguez

P. Gryczka

Decision electronically authenticated