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**Datasheet for the decision  
of 25 October 2017**

**Case Number:** T 1393/13 - 3.2.05

**Application Number:** 05821649.0

**Publication Number:** 1833648

**IPC:** B29B13/06, B29B9/06, C08F6/00

**Language of the proceedings:** EN

**Title of invention:**  
Pellet treatment unit

**Patent Proprietor:**  
Total Research & Technology Feluy

**Opponent:**  
Ineos Commercial Services UK Limited

**Headword:**

**Relevant legal provisions:**  
EPC 1973 Art. 56, 100(c)  
EPC Art. 123(2)

**Keyword:**

Amendments - main request - added subject-matter (yes) -  
auxiliary requests 1 to 8 and 10 - added subject-matter (yes)  
Inventive step - auxiliary request 9 (no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
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Case Number: T 1393/13 - 3.2.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.05**  
**of 25 October 2017**

**Appellant:** Ineos Commercial Services UK Limited  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 16 April 2013  
rejecting the opposition filed against European  
patent No. 1833648 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

<b>Chairman</b>	M. Pooock
<b>Members:</b>	P. Lanz
	J. Geschwind

## **Summary of Facts and Submissions**

- I. The appeal of the opponent is against the decision of the opposition division to reject the opposition filed against European patent EP-B-1 833 648.
- II. During the opposition proceedings, the opponent had raised the grounds for opposition specified in Article 100(a) (lack of inventive step), (b) and (c) EPC 1973.
- III. Oral proceedings were held before the board of appeal on 25 October 2017.
- IV. The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.
- V. The respondent (patent proprietor) requested that the appeal be dismissed or, in the alternative, that the decision under appeal be set aside and the patent be maintained according to any of auxiliary requests 1 to 7 filed with letter of 5 October 2012, or auxiliary request 8 filed with letter of 11 December 2013, or auxiliary requests 9 to 10 filed with letter of 22 September 2017.
- VI. The documents referred to by the parties include the following:  
  
D3: "KE Single Screw Extruder", Brochure of Berstorff GmbH, 2001;  
  
D5: WO 02/088194 A1.

VII. Independent claim 1 as granted (main request) and according to auxiliary request 2 has the following wording:

"A method for reducing volatiles in polymer pellets that comprises the steps of:

- a) retrieving the pellets from the extruder (1) and pushing them through a cooling pipe (3) with a stream of cooling water and with a residence time sufficient to reach the desired temperature;
- b) separating the pellets from the water in a dryer (4), returning the water to the cooling system via a cooling device (5) and pushing the cooled pellets through a pipe (9) into the heating silo (10);
- c) keeping the pellets for a period of time of from 5 to 50 hours in the heating silo under a stream of hot gas (11) entering near the lower end of the heating silo and escaping through the upper open surface;
- d) continuously retrieving pellets through the bottom part of the heating silo via a valve (24) that allows control of the exiting flow of material in order to keep the heating silo constantly full;
- e) feeding the pellets to a cooling device (25);
- f) keeping the cooling device at room temperature to bring the pellets' temperature down to the desired level;
- g) sending the cooled pellets to the storage silos, characterised in that the polymer pellets are polyethylene pellets, in that the heating silo is kept at a temperature of from 80 to 130 °C and that the pellets are cooled in the cooling silo to a temperature of from 60 to 70 °C."

VIII. Compared with the main request, step e) of independent claim 1 according to auxiliary requests 1 and 3 is amended as follows (added wording underlined):

"e) feeding the pellets to a cooling device (25), which is a cooling silo;"

- IX. Compared with the main request, step a) of independent claim 1 of auxiliary requests 4 and 6 is worded as follows (added wording underlined):

"a) retrieving the pellets from the extruder (1) and pushing them through a cooling pipe (3) with a stream of cooling water and with a residence time sufficient to reach the desired temperature of from 80 to 110 °C;"

- X. Compared with the main request, steps a) and e) of independent claim 1 of auxiliary requests 5 and 7 has the following wording (additions underlined):

"a) retrieving the pellets from the extruder (1) and pushing them through a cooling pipe (3) with a stream of cooling water and with a residence time sufficient to reach the desired temperature of from 80 to 110 °C;"

"e) feeding the pellets to a cooling device (25), which is a cooling silo;"

- XI. Compared with the main request, step g) of independent claim 1 of auxiliary request 8 is amended as follows (added wording underlined):

"g) sending the cooled pellets to the storage silos which are homogenisation silos,"

XII. Compared with the main request, step e) of independent claim 1 of auxiliary request 9 is formulated as follows (added wording underlined):

"e) feeding the pellets to a cooling device (25) wherein the cooling device is a cooling silo kept under a stream of gas at room temperature (26);"

XIII. Compared with the main request, steps a) and e) of independent claim 1 according to auxiliary request 10 has the following wording (additions underlined):

"a) retrieving the pellets from the extruder (1) and pushing them through a cooling pipe (3) with a stream of cooling water and with a residence time sufficient to reach the desired temperature of from 80 to 110 °C;"

"e) feeding the pellets to a cooling device (25) wherein the cooling device is a cooling silo kept under a stream of gas at room temperature (26);"

XIV. The appellant's submissions may be summarised as follows:

*Main request and auxiliary requests 1 to 8 - added subject-matter*

The preamble of claim 1 referred to a cooling device as a generic term, while the characterising portion specifically mentioned a cooling silo. In the original application, a cooling silo using gas and a heat exchange system were consistently indicated as alternative embodiments of a cooling device. This was also reflected in original claims 3 and 5. On page 11, lines 4 to 6 of the application as filed, it was



explicitly stated that in example 5 the plate heat exchanger replaced the cooling silo (cf. also page 7, lines 19 to 21). Moreover, in granted claim 1 the cooling gas present in claim 3 as filed was omitted, although the original disclosure of the cooling silo was inextricably linked to the cooling gas (original application, page 4, lines 6 to 14; page 5, lines 2 and 3; Figure 2). In granted claim 5, the cooling silo was combined with a heat exchanger. In view of that, the claims as granted went beyond the content of the application as filed. This deficiency was also present in auxiliary requests 1 to 8.

*Auxiliary request 9 - inventive step*

Document D5 served as a starting point for assessing the presence of an inventive step in the subject-matter of claim 1. Step a), which refers to pelletising, was known from document D5. For a skilled reader, the reference to quenching the extruded pellets in cold water (cf. D5, page 5, lines 20 to 24) clearly implied the use of an underwater pelletiser as shown in document D3. Also claim step d) did not constitute a difference in view of document D5, which comprised a continuously operating valve and did not work batch-wise. Regarding the respondent's argument that a full silo would reduce the residence time, it had to be noted that increasing the mass contained in the silo actually increased the residence time. Moreover, it was technically impossible to completely fill a silo to the top. The exact filling level was arbitrary and also dependent on the flow rate. In that respect, no difference was apparent in comparison with the known silo of document D5. The same was true for the optional provision of a pre-heating silo (cf. D5, page 5, lines 3 to 13) and of a preliminary step involving the

removal of unreacted monomers (cf. D5, page 3, lines 8 to 10). The latter option was standard practice and not excluded by the claimed method. The only remaining difference was to keep the cooling device at room temperature, which was the simplest and cheapest option to enable cooling of the treated pellets. Hence, this feature could not provide an inventive step.

*Auxiliary request 10 - added subject-matter*

The added feature of the desired temperature of 80 to 110°C was isolated from its specific context on page 5, line 26 to page 6, line 24. There the temperature was not indicated as an absolute value but relative to the temperature of the heating silo (cf. the wording "*as close as possible to the temperature of the heating silo*"). Moreover, reference to the two methods of how this claimed temperature could be achieved was omitted. Finally, the temperature range added to claim 1 was not consistent with the residence times indicated in the dependent claims. Consequently, the claims of auxiliary request 10 went beyond the content of the application as filed.

XV. The respondent argued essentially as follows:

*Main request and auxiliary requests 1 to 8 - added subject-matter*

For a mind willing to understand, it was clear that the cooling device and the cooling silo referred to the same device. This interpretation was supported by the fact that the same reference number 25 was used for both devices in the patent in suit, which also had the same purpose. The term "cooling silo" had different meanings and covered both embodiments of present claims

3 and 5, so that no unallowable alteration of the original teaching had occurred. The terminology used in the context of the cooling device in the opposed patent did not imply a specific technical teaching. In general, a silo had no specific shape. Reference could be made to the passage on page 4, line 19 to page 5, line 1, to Table 1 and to examples 1, 2 and 5 of the application as filed. Moreover, the aspect of the stream of cooling gas in the silo was not essential and could therefore be omitted from granted claim 1.

*Auxiliary request 9 - inventive step*

Claim 1 contained step d), according to which the heating silo was constantly full. This aspect was not disclosed in document D5 and constituted, in addition to steps a), b) and f), a further distinction of the subject-matter claimed over document D5. In that regard particular reference was made to Figure 1, page 9, line 6 and page 11, line 26 of document D5. Moreover, regarding the technical effects and the inventive merits of the claimed method, they had to be looked at as a whole instead of isolating individual steps. From the individual effects of reducing water consumption, avoiding the creation of angel hair and reducing the pellets' residence time by having a full silo, when considered together, the general technical problem of increasing the efficiency of the method could be derived. The claimed solution to that problem was not obvious. Document D5 did not contain any hint pointing towards the problem posed or the subject-matter claimed. Moreover, document D5 suggested a preliminary step of removing unreacted monomers and an additional step of pre-heating the pellets, which did not form part of the present claim. This document was therefore leading the skilled person away from the invention.

Even though underwater pelletisers as shown in document D3 were known, they did not achieve the overall result of the subject-matter claimed, which was thus based on an inventive step.

*Auxiliary request 10 - added subject-matter*

In view of the method as a whole, it was not necessary to add to the desired temperature of 80 to 110°C the two options of how this could be achieved (cf. application as filed, page 5, line 30 to page 6, line 24). For the skilled person, it was obvious that the claimed temperature could be achieved by reducing the residence time in the cooling system or by increasing the temperature of the cooling water. Moreover, as indicated by the term "typically", the overall teaching in this part of the application was more general than its literal wording. For these reasons, the subject-matter of claim 1 did not go beyond the original disclosure.

**Reasons for the Decision**

1. *Main request and auxiliary requests 1 to 8 - added subject-matter*

1.1 On the issue of added subject-matter in claim 1 as granted, reference is made to the original application, which indicates two embodiments of the cooling device mentioned in original claim 1:

- a cooling silo, where the pellets are cooled by a stream of cool gas at room temperature (cf. page 4, lines 4 to 10 and dependent claim 3); or alternatively

- a heat exchange system formed of vertical plates cooled by water at room temperature between which the pellets fall under gravitational acceleration (cf. page 7, lines 19 to 26 (*"In yet another embodiment according to the present invention, the cooling silo is replaced by a heat exchange system formed of vertical plates filled with water at room temperature. [...]"*) and dependent claim 5).

It can be deduced from the above that no inconsistency is apparent from the disclosure of the application as filed with regard to the alternative nature of the two embodiments of the cooling silo and the heat exchanger.

1.2 Claim 1 as granted is explicitly restricted to the first embodiment of a cooling device in the form of a cooling silo. However, this embodiment is consistently disclosed as comprising a stream of gas at room temperature as set out in original claim 3. Consequently, the omission of the latter aspect in contested claim 1 goes beyond the content of the application as filed. As explained above, the cooling silo and the heat exchanger were originally presented as mutually exclusive alternatives (cf. original claims 3 and 5). Now claiming these cooling devices in combination (cf. granted claims 1 and 5) constitutes a further issue of added subject-matter. Contrary to the respondent's argument, the fact that the same reference number 25 is used in the description for both of these alternative embodiments of the cooling device does not imply the technical teaching that the terms cooling silo and heat exchanger have the same meaning.

1.3 For these reasons, the subject-matter of granted claim 1 of the main request goes beyond the content of the application as filed (Article 100(c) EPC 1973).

It is further observed that the above reasoning also applies to auxiliary requests 1 to 8, which similarly contain the claim wording found deficient.

Consequently, the claims of auxiliary requests 1 to 8 do not meet the provisions of Article 123(2) EPC.

2. *Auxiliary request 9 - inventive step*

2.1 Closest prior art

2.1.1 Document D5 is directed to the same purpose as the claimed invention and has most of the relevant technical features in common with the subject-matter claimed. It is therefore considered the closest prior art.

2.1.2 Document D5 discloses in its preferred embodiment a method for reducing volatiles in polymer pellets (cf. page 1, first paragraph) comprising the steps of:

a') retrieving the pellets from the extruder and cooling them with cooling water and with a residence time sufficient to reach the desired temperature (page 5, lines 21 and 22: "*... cold water quenching of pellet produced directly from a pelleting machine*");

b') separating the pellets from the water in a dryer (page 5, lines 20 to 25: "*The particulate polymer fed to the heating vessel [...] can contain residual water (eg surface moisture arising from cold water quenching of pellet produced directly from a pelleting machine) [...]. Preferably the particulate polymer is substantially free from water before being fed to the purge vessel.*") and pushing the cooled pellets through

a pipe into the heating silo (page 6, lines 2 to 5: *"The particulate polymer is fed to the purge vessel in any convenient manner, for example, using pneumatic conveying or by means of gravity feed devices employing suitable feeder valve means between the source and the purge vessel. It is preferred to feed the particulate polymer continuously to the purge vessel."*);

c) keeping the pellets for a period of time of from 5 to 50 hours (page 6, lines 21 to 25: *"Where the particulate polymer flows through the purge vessel in a substantially plug-flow manner, the rate of flow and the dimensions of the purge vessel are suitably arranged so that the residence time of the particulate polymer in the purge vessel lies in the range from about 0.5 to 16 hours, preferably 2 to 16 hours, more preferably 6 to 10 hours."*) in the heating silo under a stream of hot gas entering near the lower end of the heating silo and escaping through the upper open surface (page 7, lines 15 and 16: *"Air is passed through the purge vessel counter current to the flow of the particulate polymer therein."*);

d) continuously retrieving pellets through the bottom part of the heating silo via a valve that allows control of the exiting flow of material in order to keep the heating silo constantly full (page 8, line 28 to page 9, lines 7: *"The particulate polymer is suitably removed from the purge vessel using conventional industrial conveying means for particulate materials. The particulate polymer is preferably removed from the purge vessel using withdrawal means to continuously withdraw said polymer therefrom, for example motorised valves or motorised screws. Preferably the withdrawal means are variable rate withdrawal means, for example, using variable speed*

*motorised valves or motorised screws. The vessel is preferably equipped with means to detect the quantity or level of particulate polymer therein, for example a means to detect the level of settled particulate polymer in the vessel. Preferably the means to detect the quantity or level of particulate polymer within the vessel is coupled with the variable rate withdrawal means, for example, to maintain a constant volume of particulate polymer within the vessel. The coupling may be achieved, for example, by electronic means or mechanical means.");*

*e) feeding the pellets to a cooling device (page 9, lines 8 to 17: "After the particulate polymer has passed through the purge vessel it is normally still hot and may require cooling before being transferred to storage or undergoing further treatment or processing. For example, in the case of polyethylene, if it is desired to transfer the particulate polymer to storage using dilute phase pneumatic conveying means, it is preferred to cool it to a temperature below about 65 °C before transfer to reduce the possibility of so called "angel hair" forming in the pneumatic conveying lines. The means used to cool the particulate polymer, if any, can comprise, for example, conventional industrial particulate cooling equipment. For example, the hot particulate polymer can be fed to a gas fluidised bed cooler operating under batch or continuous conditions.");*

*g) sending the cooled pellets to the storage silos (page 9, lines 10 and 11: "[...] if it is desired to transfer the particulate polymer to storage [...]");*

*wherein the polymer pellets are polyethylene pellets, and wherein the heating silo is kept at a temperature*



of from 80 to 130°C (page 6, line 32 to page 7, line 2: *"In the case that the particulate polymer is high density polyethylene having a density of at least 0.945, the temperature of the heating in the purge vessel is preferably in the range 70 to 100 °C."*) and wherein the pellets are cooled in the cooling silo to a temperature of from 60 to 70°C (page 9, lines 10 to 14: *"For example, in the case of polyethylene, if it is desired to transfer the particulate polymer to storage using dilute phase pneumatic conveying means, it is preferred to cool it to a temperature below about 65 °C before transfer to reduce the possibility of so called "angel hair" forming in the pneumatic conveying lines."*).

2.1.3 Regarding the respondent's argument, that, by contrast to the contested claim, the heating silo of document D5 was not constantly full, the board notes that, for the skilled reader, the heating silo 1 in schematic Figure 1 of document D5 is actually depicted as being full. Moreover, the bottom of this prior art heating silo is equipped with a motorised valve 18 for continuously retrieving pellets (cf. D5, page 12, lines 9 and 10) so that the residence time in the heating silo is controlled at eight hours  $\pm$ 15 minutes (cf. D5, page 11, line 29 to page 12, line 1). This known valve therefore allows to control the exiting flow of material in order to keep the heating silo constantly full as required by the wording of step d) of disputed claim 1. Consequently, step d) cannot distinguish the claimed subject-matter from the content of document D5.

2.1.4 In the judgement of the board, the subject-matter of claim 1 differs from the preferred embodiment of document D5 essentially in the features of

a'') pushing the pellets through a cooling pipe with a stream of cooling water;

b'') returning the water to the cooling system via a cooling device; and

f) keeping the cooling device at room temperature to bring the pellets' temperature down to the desired level.

## 2.2 Partial technical problems

2.2.1 Distinguishing features a'') and b''), on the one hand, and feature f), on the other hand, are functionally independent of each other and without any apparent synergistic or combinative effect. Contrary to the respondent's point of view, the design of the water circuit of the pelletiser in steps a) and b) and the selection of a cooling temperature for the treated pellets in step f) after removing the volatiles are not interrelated, which excludes any synergistic effects. Thus, according to the established case law, a possible inventive contribution has to be assessed independently for each of them (see Case Law of the Boards of Appeal of the European Patent Office, 8th edition, 2016, I.D. 9.2.2).

2.2.2 The first partial technical problem relating to features a'') and b'') is to provide efficient cooling of the pellets while avoiding cooling-water wastage.

The second partial technical problem relating to feature f) resides in the selection of an appropriate temperature for the cooling device in order to cool the pellets from 80 to 130°C down to 60 to 70°C.

2.3 Obviousness of the claimed solutions

2.3.1 Regarding the first partial technical problem, reference is made to a typical underwater pelletiser as shown in document D3, pages 17, 20 and 21. Pelletisers of this type quench the extruded pellets in a cooling-water circuit pushing the pellets through a cooling pipe with a stream of cooling water before returning the water to the pelletiser via a cooling device, which allows for a reduction of water consumption. For the skilled person aware of such commercially available pelletising equipment, it is a straightforward measure to use a customary underwater pelletiser for the task of pelletising and quenching the extruded pellets mentioned in document D5 (page 5, lines 20 to 25).

2.3.2 As to the second partial problem, it belongs to the routine tasks of the skilled person to select an appropriate temperature for the cooling device in order to cool the treated pellets from 80 to 130°C down to 60 to 70°C. In this context, the simplest option is to choose room temperature as the cooling temperature. Moreover, no unexpected effect is apparent or claimed for feature f). Therefore, this feature is not suitable for rendering the subject-matter of claim 1 inventive.

2.3.3 Finally, in view of the respondent's related submissions, it is observed that the provision of a pre-heating silo in document D5 is optional (cf. D5, page 5, lines 14 to 16). Furthermore, the wording of the contested method claim does not exclude the preliminary step of removing unreacted monomers before extrusion or pre-heating the extruded and quenched pellets before treating them in the heating silo. Hence, these aspects do not alter the above conclusions on inventive step.

For these reasons, the subject-matter of claim 1 of the main request is not based on an inventive step within the meaning of Article 56 EPC 1973.

3. *Auxiliary request 10 - added subject-matter*

3.1 In step a) of claim 1 of auxiliary request 10, the feature of the desired temperature of 80 to 110°C was added.

3.2 This limitation is disclosed on page 5, line 29 of the application as filed. However, there the temperature range now claimed is mentioned in a specific context: the extruded pellets are cooled to a temperature higher than the typical temperature of 60 to 70°C and as close as possible to the temperature of the heating silo of 80 to 110°C (cf. page 5, lines 26 to 30). This can be achieved by either reducing the residence time in the cooling system or increasing the temperature of the cooling water (cf. page 5, line 30 to page 6, last line). According to the first paragraph of page 7, *"[i]n either of these two methods, the pellets are kept at a temperature that is close to that of the heating silo and the amount of hot gas necessary to treat the pellets is thus considerably reduced."*

3.3 In view of the above, the principal teaching of the cited passage to the skilled person is that the amount of hot gas necessary to treat the pellets in the heating silo can be reduced by cooling the extruded pellets to a temperature as close as possible to the temperature of the heating silo, which is typically from 80 to 110°C for polyethylene. In the judgement of the board, this is not properly reflected in claim 1 of auxiliary request 10, where the temperature is defined

in absolute terms and without any reference to the temperature of the heating silo.

Consequently, the subject-matter of claim 1 of auxiliary request 10 goes beyond the content of the application as originally filed, contrary to the provisions of Article 123(2) EPC.

## 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:



L. Stridde

M. Poock

Decision electronically authenticated