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**Datasheet for the decision
of 11 January 2017**

Case Number: T 1113/15 - 3.3.03

Application Number: 99935230.5

Publication Number: 1095102

IPC: C08L23/04

Language of the proceedings: EN

Title of invention:
POLYMER COMPOSITION FOR PIPES

Patent Proprietor:
Borealis Technology Oy

Opponents:
Basell Polyolefine GmbH
Ineos Sales (UK) Limited

Relevant legal provisions:
RPBA Art. 13(1)
EPC Art. 83, 111(1)

Keyword:
Late-filed document - justification for late filing (yes)
Sufficiency of disclosure - main request (yes)
Appeal decision - remittal to the department of first instance
(yes)

Decisions cited:

G 0004/88



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Case Number: T 1113/15 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 11 January 2017

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 7 April 2015
revoking European patent No. 1095102 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman D. Semino
Members: F. Rousseau
 R. Cramer

Summary of Facts and Submissions

I. This is the second appeal in relation to opposition proceedings against European patent No. 1 095 102, independent claim 1 of which read as follows:

"1. A multimodal polyethylene composition for pipes, which multimodal polyethylene has a density of 0.930-0.965 g/cm³ and an MFR₅ of 0.2-1.2 g/10 min, characterised in that the multimodal polyethylene has an M_n of 8000-15000, an M_w of 180-330 x 10³, and an M_w/M_n of 20-35, said multimodal polyethylene comprising a low molecular weight (LMW) ethylene homopolymer fraction and a high molecular weight (HMW) ethylene copolymer fraction, said HMW fraction having a lower molecular weight limit of 3500, and a weight ratio of the LMW fraction to the HMW fraction of (35-55) : (65-45)."

II. In the first appeal identified as T 0059/08, the Board decided that the absence of any indication in the patent in suit of methods for determining M_w, M_n and the "lower limit of the high molecular weight (HMW) ethylene copolymer fraction" and the resulting uncertainty concerning the claimed composition did not allow as such to conclude to a lack of sufficiency of disclosure, but merely to a lack of clarity which did not arise out of any amendment to the granted claims and therefore could not be objected to in opposition proceedings. Noting that none of the core issues in respect of sufficiency of disclosure which had been addressed by the parties before the opposition decision had been decided by the first instance, nor argued before the Board, the decision under appeal was set

aside and the case remitted to the opposition division for further prosecution.

III. The second and present appeal by the patent proprietor lies from the decision of the opposition division posted on 7 April 2015 to revoke the patent again on the ground that it did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC). That decision was based on a main request (claims 1 to 15 and pages 2 and 4 to 6 as granted and amended page 3 as submitted with letter of 13 January 2015), as well as 3 sets of amended claims.

IV. The following items of evidence had been cited *inter alia* in the contested decision:

E4: EP-B-0 517 868 and corresponding PCT application WO 92/12182

E18: EP-A-0 688 794

E19: WO99/551646

E23 and E24: Experimental reports 1 and 2, respectively, both submitted with letter of the Patent Proprietor of 24 August 2007.

V. According to the reasons of the second decision the teaching provided in the specification, including the examples, was merely confined to the method of producing a multimodal polyethylene composition described in prior art document E4 and to the use of catalysts described in prior art documents E18 and E19. The patent proprietor, however, had shown with E23 that the skilled person using the Ziegler-Natta catalyst Lynx 200 would not arrive at a resin having a lower limit of 3500 for the HMW ethylene copolymer fraction, unless that catalyst was pre-treated with THF, which

pre-treatment was neither taught in the patent in suit, nor part of his general knowledge. The whole specification did not contain any information going beyond the generic information given in the prior art referred to in the specification and no indication was given how to modify such information in order to achieve the characterizing feature of the claimed composition, namely a lower molecular weight limit of the HMW ethylene copolymer fraction of 3500. Moreover, the skilled person could not rely on the teaching of the prior art either, because that characterizing feature was unusual. Considering that of two embodiments of E23 prepared according to the patent specification, only one was shown to satisfy all the requirements of claim 1, it was concluded that the skilled person could arrive at the claimed subject-matter only by trial and error, which amounted to an undue burden. Accordingly, the claimed invention was insufficiently disclosed.

VI. An appeal against that decision was lodged by the patent proprietor (appellant). The statement of grounds of appeal included a main request and five sets of claims as first to fifth auxiliary requests. The patent documents according to the main request consisted of claims 1 to 15 and pages 2 and 4 to 6 as granted and an amended page 3.

VII. In its communication under Article 15(1) RPBA the Board expressed a preliminary opinion on the issue of sufficiency of disclosure in which it was indicated *inter alia* that the catalyst Lynx 200 used in E23 had not been indicated to be one described in E18 or E19, the use of which was recommended in paragraph [29] of the patent in suit (point 17). It was also indicated that the conditions for a transfer of opposition from

Ineos Commercial Services UK Limited to Ineos Sales (UK) Limited were considered to be fulfilled (last paragraph of point 1).

VIII. In response to the Board's communication, opponent 2 (respondent 2) submitted with letter of 8 December 2016 two documents referred to as E41 (Antonio Diaz Barrios *et al.* "Lynx® 200: An advanced Ziegler-Natta type catalyst for polyethylene production", *Vision Tecnologica* / vol. 9 n°2, 2002, pages 75-80) and E42 (EP-A-1 460 105).

IX. Oral proceedings took place on 11 January 2017.

X. The submissions of the appellant, as far as they are relevant for the decision, can be summarized as follows:

(a) Contrary to the finding of the opposition division the teaching of the patent in suit went beyond the general information given in the prior art documents E4, E18 and E19. The patent in suit provided in particular two examples for the production of the claimed composition. They contained information about the various polymerisation stages (prepolymerisation and production of the LMW part of the composition in a loop reactor, followed by production of the HMW part of the composition in a gas phase reactor), the nature of the fractions (homopolymer, copolymer, amount of comonomer), their proportion, as well as the properties of the final polymer (density, MFR₅, M_n, M_w, and M_w/M_n). The set up of the process described in the examples was consistent with its general description in the rest of the specification. The conditions to be used for

the polymerisation which were not specified in the examples could be taken from the general part of the description wherein preferred ranges to be used in each of the reactors were defined for the temperature and the amount of chain transfer agent (hydrogen). The pressure was not specified as it was not critical, but a suitable range of values was indicated in E4 to which the patent in suit referred.

- (b) An important measure for the various reaction stages was the choice of the catalyst and when it should be added, which information was given in the specification. Example 1 of the patent in suit, in line with paragraph 29 referred to the catalysts of E18. When analysing that document the skilled person would be directed to the sole catalysts specifically disclosed therein, namely the catalysts used in Examples 2 and 3, corresponding to the same catalyst, prepared either on a laboratory or industrial scale.

- (c) It was conventional knowledge that the molecular weight of each fraction could be adjusted by varying the hydrogen concentration with respect to ethylene, which measure could be used to achieve a lower molecular weight limit of the HMW ethylene copolymer fraction of 3500. The polydispersity of the final polymer was known to be dependent on the molecular weight distribution of each of the fractions, i.e on the shape of the peaks representing the HMW and LMW fractions and their distance on the diagram representing the molecular weight distribution curve. The shape of the distinct curves was determined by the catalyst used and the molecular weight of each fraction could be

adjusted by changing the hydrogen concentration in each reactor.

- (d) E23 and E24 showed that it was possible to reproduce the claimed resins following the disclosure of the patent. E23 irrespective of whether it was suitable or not to demonstrate that the claimed subject-matter was sufficiency disclosed, should be taken into account for assessing inventive step, because it showed that the presence of comonomer in the LMW fraction resulted in a pressure pipe having poor strength. E24 was an analysis of the material produced in Example 2 of the patent in suit, although E24 erroneously referred to Example 1. E24 demonstrated that the composition produced in Example 2 of the patent in suit fulfilled the criteria of a HMW fraction having a lower molecular weight limit of 3500. The filler mentioned in E24 had to be removed from the samples prior to the preparative fractionation. It was carbon black used for UV-protection in the preparation of Example 2, but had not been mentioned in the description of said example.
- (e) Accordingly, the patent in suit provided at least one way to obtain the claimed compositions. The burden of proof that the compositions claimed could not be obtained by the skilled person by repeating the teaching contained in the patent in suit was on the opponents, but none of them had ever made the slightest attempt to reproduce the claimed compositions. However, serious doubts substantiated by verifiable facts which was a necessary requirement in order to deny sufficiency of

disclosure, did not exist. Sufficiency of disclosure should therefore be acknowledged.

- (f) Should the Board find any of the sets of claims on file to be allowable having regard to the requirements of sufficiency of disclosure, the case should be remitted to the opposition division for deciding on novelty and inventive step.

XI. The submissions of the opponents (respondents), as far as they are relevant for the decision, can be summarized as follows:

- (a) The relevant question was whether the skilled person could reliably obtain a composition satisfying the characterizing feature of claim 1, namely the lower molecular weight limit of 3500 for the HMW fraction. Although there may be sufficient information in the patent to enable the skilled person to make compositions having the properties specified in Examples 1 and 2 of the patent, those related to the final composition only, but not to the specific property of the HMW fraction. Those examples did not contain any detail about the process conditions used (composition of the catalyst, polymerisation pressure and temperature, amount of hydrogen fed in the reactor, amount of comonomer in the third reactor and residence time in the reactors) and those mentioned in the general disclosure of the patent in suit were general ranges typical of the processes of the prior art. The final properties of the compositions of Examples 1 and 2 were of no help in order to determine specific conditions to be selected, because there was more than one possible combination of prepolymer, LMW and HMW fractions

which would produce a polymer having the final properties mentioned therein. There was no guarantee that the HMW fraction would have a lower molecular weight limit above 3500, and there was nothing in the description of the examples to ensure that this was the case. It was even unknown whether the compositions obtained with the examples were multimodal. The mechanical values disclosed for the products obtained in Examples 1 and 2 of the patent in suit also did not allow the conclusion that the lower molecular weight limit above 3500 had been achieved for those examples, as many other factors might also influence those mechanical values. The skilled person would be required to perform a "trial and error" exercise to find a composition which had all the final properties specified in the examples of the patent and also the HMW 3500 limit feature. This constituted an undue burden.

- (b) E23 showed that by following exactly the teaching of the patent in suit and using a catalyst as generally described therein to be suitable for obtaining the claimed composition, namely a Ziegler-Natta type catalyst with a high overall activity, as well as a good activity balance over a wide range of hydrogen partial pressures, the key process step which determined whether or not the lower limit of 3500 for the HMW fraction could be obtained was the pretreatment of the catalyst precursor with THF. Said pretreatment, however, was not taught in the patent in suit. Such a process step was neither described in E18 and E19 referred to in the patent in suit for the choice of the catalyst, nor part of the common general knowledge. As evidence that the catalyst Lynx 200 used in E23

was a Ziegler-Natta type catalyst with a high overall activity as well as a good activity balance over a wide range of hydrogen partial pressures, reference was made to E41 and E42. Moreover, E23 had been carried out by one of the inventors of the patent in suit and could not be considered as being representative of a repeat by a third party having only general knowledge in the field at the date of filing of the patent application.

- (c) As to E24, it was unclear whether it represented an analysis of the original material of one the examples of the patent or a repeat of that example nine years after the date of filing. The expression "made according to Example 1", the presence of a filler which was not described in Examples 1 and 2 and the amount of comonomer which differed from that used in Example 1 cast doubt on whether E24 related to the compositions obtained in the examples of the patent in suit. Furthermore, E24 used ^{13}C -NMR as analytical method to determine the comonomer content of the various fractions of the HMW, which technique in view of its detection limit was not suitable to demonstrate the absolute absence of comonomer chains in the fractions having low molecular weight. Therefore, E24 did not prove beyond doubt that Example 2 was inside the claim.
- (d) Even if E24 were accepted as evidence that original Example 2 was inside claim 1, it did not prove anyway that the skilled person repeating that example could prepare with reasonable effort a composition meeting all requirements of claim 1. If a filler had been added to the compositions of the examples of the patent in suit, the intense mixing required for that step would also influence the

parameters defined in claim 1 that relate to the molecular distribution.

- (e) Even if it was accepted that one could repeat Examples 1 and 2 and obtain a composition inside claim 1, the patent in suit did not teach how to obtain other compositions possessing the lower limit of 3500 for the HMW fraction. This was not trivial as the features of claim 1 were interrelated, meaning that modifying one of those affected the others. Considering that the appellant alleged that the compositions of the prior art did not satisfy said lower limit of 3500 for the HMW fraction, the patent in suit had to teach what to do differently in order to obtain a composition possessing that feature, which according to the appellant had never been achieved. However the patent in suit did not teach how to obtain that alleged distinguishing and unique feature, let alone in combination with the other features recited in claim 1, i.e. the teaching of the patent in suit did not go beyond that of E4 and E18. It was also questionable whether a composition having a narrow molecular weight distribution at the bottom of the claimed range, and also a low molecular weight (i.e. an MFR_5 at the top of the claimed range) could have an HMW fraction entirely above the 3500 limit. It was also doubtful how the skilled person could obtain a M_w/M_n ratio as high as 30, while keeping the other parameters in the range claimed. E4 cited in the patent in suit did not extend to such high M_w/M_n ratio. E23 showed that by following the teaching of the patent in suit, one could obtain a material outside the claim. According to the general legal principle enounced in T 0435/91 of 9 March 1994 that the

protection covered by a patent should correspond to the technical contribution to the art made by the disclosure of the invention described therein, which excludes that the patent monopoly be extended to subject-matter which, after reading the patent specification, would still not be at the disposal of the skilled person, it had to be concluded that the subject-matter of claim 1 was not sufficiently disclosed.

- (f) Should the Board find that any request meets the requirements of sufficiency of disclosure, the case should be remitted to the opposition division for examination of novelty and inventive step. If the Board considered that E23 were not relevant for the question of sufficiency of disclosure, because it did not use a catalyst as taught in the patent, then it was submitted that for the same reason it could not be used to support an argument of inventive step, since a skilled person following the teaching of the patent could not obtain such a composition. This should be made clear in the decision.

XII. The appellant requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request, or alternatively on the basis of any of the first to fifth auxiliary requests, all submitted with the statement of grounds of appeal.

XIII. The respondents requested that the appeal be dismissed.

Reasons for the Decision

Transfer of an opposition

1. On 24 October 2013 a request for a transfer of the opposition from Ineos Commercial Services UK Limited to Ineos Sales (UK) Limited was filed by respondent 2. The request contained a declaration of transfer showing *inter alia* that Ineos Commercial Services UK Limited had sold its entire polyolefins technology business to Ineos Sales (UK) Limited. The Board is therefore satisfied that the conditions for a transfer of the opponent's status as set out in the decision of the Enlarged Board of Appeal G 4/88 (OJ EPO 1989, 480) were met. The request for transfer of the opposition made by respondent 2 is therefore granted.

Admittance of documents E41 and E42

2. The submissions of respondent 2 in its letter of 8 December 2016, including evidence E41 and E42 on which they rely, are in direct response to the issue raised by the Board in its communication sent in preparation for oral proceedings as to whether Lynx 200 used in E23 could be considered as one of the catalysts described in the patent in suit to be suitable to produce the claimed compositions. Hence, the Board finds it appropriate to admit said submissions of respondent 2 into the proceedings by exercising its discretion pursuant to Article 13(1) RPBA.

Sufficiency of disclosure

3. The objection that the invention lacks sufficiency of disclosure is directed against the multimodal polyethylene composition for pipes being the subject-matter of claim 1. This composition is defined in terms of structural features - it comprises a mixture of an ethylene homopolymer fraction and of an ethylene copolymer fraction in a given range of ratios - as well as in terms of parametric features, which set out the molecular weight distribution of the multimodal polyethylene, its density and its MFR₅ value. The molecular weight distribution of the multimodal polyethylene, i.e comprising both the ethylene homopolymer fraction and the ethylene copolymer fraction, is defined by its number-average molecular weight M_n within a range of 8000-15000, its weight-average molecular weight M_w in the range of 180-330 x 10³, its polydispersity (M_w/M_n) in the range of 20-25, supplemented by the definition of the lower molecular weight limit of the HMW fraction being 3500. Although the latter feature might be unusual as was argued by the respondents in the sense that it might not have been used before, it has nevertheless a concrete meaning, as it merely defines for the HMW fraction the position of the left part of the molecular weight distribution curve.
4. The objection of the respondents as well as the reasons of the contested decision are based on the view that it would require undue burden for the skilled person to achieve the molecular weight distribution defined in claim 1. It was in particular emphasized that the skilled person could not reliably obtain a polyethylene satisfying that lower molecular weight limit of the HMW fraction. According to the established jurisprudence of

the Boards of Appeal of the EPO a European patent complies with the the requirements of sufficiency of disclosure if a skilled person, on the basis of the information provided in the patent specification and, if necessary, using common general knowledge, is able to carry out the invention as claimed in its whole extent without undue burden, i.e. with reasonable effort. According to the case law (see Case Law of the Boards of Appeal, 8th Edition, 2016, II.C.4.2 and II.C.4.4), an invention is in principle sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to perform the invention in the whole range that is claimed.

Information provided in the patent specification

5. The patent in suit teaches in paragraphs 24 to 26 that the claimed composition is preferably produced in two main polymerisation stages in a combination of loop reactor/gas-phase reactor connected in series as described in E4. The respondents do not dispute that the principle of that technique in order to obtain a multimodal polyethylene composition is known in the art. The skilled reader is in particular taught in the specification, in line with the teaching of E4, that the LMW ethylene homopolymer fraction is produced in the first reactor, owing to a high content of chain-transfer agent (hydrogen gas), whereas the HMW copolymer fraction is produced in the second stage using a lower content of chain-transfer agent. The final product consists of an intimate mixture of the polymers obtained through the sequential polymerisation stages, and the mixture of those polymers having different molecular-weight-distribution patterns exhibits a multimodal molecular-weight-distribution pattern.

6. It is undisputed that the molecular weight distribution obtained for each of the fractions depends on the polymerisation conditions used for preparing those fractions and that those conditions, in addition to the split value, i.e. the proportion of the amount of polymer produced in each reactor, have to be carefully selected to obtain the claimed molecular weight distribution of the whole composition. In this respect the preferred and most preferred polymerisation temperature for the loop reactor is indicated in paragraph 27 of the patent in suit, namely 92-98°C, more preferably about 95°C, which temperature represents a narrow selection of the preferred values disclosed on page 3, lines 52-53 (85 to 100°C) and in the examples of E4 (75 to 95°C). The same holds true for the temperature in the gas-phase reactor, preferably 75-90°C, more preferably 80-85°C, which also is more precise than the preferred range of values indicated on page 4, lines 5-6 of E4 (70 to 100°C) and in its examples (75 to 85°C). A similar observation is to be made for the amount of hydrogen described in paragraph 28 of the patent in suit, preferably 350-450 moles of H₂/kmoles of ethylene added to the reactor producing the LMW fraction and 20-40 moles of H₂/kmoles of ethylene added to the reactor producing the HMW fraction. Those amounts represent narrow selections from the ranges (preferably 0 to 500 mol/kmoles of ethylene in the loop reactor and a lower ratio to be used in the gas-phase reactor) described in the general part of E4 (page 3, lines 56-58 and page 4, lines 25-26) and are distant from those used in the examples of that prior art (between 103 and 211 moles of H₂/kmoles of ethylene in the loop reactor and 10, 80, 200 and 261 moles of H₂/kmoles of ethylene in the gas phase reactor). As to the proportion of the fractions

produced in series, the patent in suit outlines the importance of a proper selection thereof and describes to this effect preferred ranges of the weight ratio of the LMW fraction to the HMW fraction, preferably 43-51:57-49 and more preferably 43-48:57-52 (paragraph 12), as well as the preferred amount of prepolymer (paragraph 25), whereas E4 discloses that the loop reactor conditions are selected so that preferably 40-90% of the total production is polymerised therein (page 3, lines 51-52). In addition, the patent in suit teaches at page 4, lines 41-44 that the main polymerisation stage is advantageously preceded by prepolymerisation of an ethylene homopolymer (HDPE) in order to obtain a more homogeneous product in the end, whereas the process of E4 is not described to use such prepolymerisation step. All the catalyst used for the process is charged at the prepolymerisation step which is performed as a slurry polymerisation in a loop reactor.

7. As to the polymerisation catalyst, Ziegler-Natta type catalysts having a high overall activity as well as a good activity balance over a wide range of hydrogen partial pressures are preferably used (paragraph 29). This preference results from the facts, as shown by paragraphs 25, 26 and 28, that all the catalyst is charged at the prepolymerisation stage, and that the partial pressures of hydrogen in the loop and the gas-phase reactors must be substantially different in order to obtain two polymer fractions whose mixture exhibits a bimodal distribution. Such catalyst is described to be preferably one disclosed in E18 and E19. As far as E18 is concerned, the skilled person would be directed to the specific catalysts representative of the teaching disclosed therein, namely the sole catalysts described in the examples of that document which fulfil

the conditions of a sufficient activity balance as defined in claim 1 of that document, namely sufficient activity for producing high molecular weight polymers, but also low molecular weight polymers as a result of the variation of the amount of hydrogen introduced as chain transfer agent (E18, page 3, lines 25-49). Those specific catalysts are those described in Examples 2 and 3 which virtually have the same composition, one being prepared on a laboratory scale, whereas the other is prepared on an industrial scale.

8. Moreover the skilled person would gain further information from the experimental part of the patent in suit. Although the text of the experimental part under the headings "Example 1" and "Example 2" does not explicitly describe whether or not the resins obtained with those examples are multimodal and exhibit a lower molecular weight limit of 3500 for the HMW fraction, no indication can be taken from the patent in suit that they were considered by its drafter to concern processes which do not lead to the composition defined in claim 1. On the contrary the mere fact that those were defined as examples and not comparative examples not only in the granted version, but also at the date of filing, leads the skilled person trying to reproduce the claimed invention to the assumption that the processes described therein were meant by the writer of the application in suit to lead to a composition fulfilling the parametric definition of claim 1 as filed corresponding to present claim 1. Furthermore, the indication on page 4 of the application as filed (lines 10-12) that a limit of 3500 should be achieved in order to avoid a pressure pipe with poor strength would lead the skilled person trying to reproduce the invention to the understanding that the examples of the patent in suit which cannot be considered to exhibit

poor strength in view of the experimental data provided therein were meant by the drafter of the patent in suit to fulfil such criteria. Furthermore, a comparison in Example 1 by reference to a conventional unimodal polyethylene pipe resin can be taken as a suggestion that the polymer produced in that example is meant to be multimodal. Moreover, the skilled person finds in Examples 1 and 2 of the contested patent the confirmation to use a three-step process comprising prepolymerisation in a loop-reactor followed by polymerisation in a loop-reactor and in a gas-phase reactor in presence of a catalyst according to E18, a comonomer being only used for the HMW fraction produced in a gas-phase reactor. Those two examples also indicate the various proportions of polymer prepared in each of the reactors, confirming the information given in the general description of the process.

Consequently, independently of whether or not Examples 1 and 2 have been proven to represent embodiments of claim 1 of the patent in suit (see point 20 below), it can be concluded that the skilled person would nevertheless understand that they were meant as such by the drafter of the application and that those examples confirmed the technical information contained in the general part of the description as indicated in above points 5 to 7.

9. As to the argument that the patent in suit was silent with respect to the pressure in the reactors, the Board is convinced that the skilled person would refer to E4 describing in the last paragraph of page 3 and the first and fifth paragraphs of page 4 the pressure conditions to be conventionally used. In the absence of any evidence suggesting that the selection of a pressure value within the ranges generally disclosed in E4 would have any effect on the molecular weight of the

product, the Board has no reason to assume that the absence of any indication in this respect in the patent in suit is detrimental to sufficiency of disclosure.

10. Summing up, the skilled person looking at the information provided in the patent in suit with respect to the conditions to be used for the sequential polymerisation would be directed to the preferred conditions indicated therein, the teaching of which goes far beyond the information provided in the prior art, in particular E4 to which it is referred in the patent in suit. In addition, the patent in suit by the reference to E18 implicitly provides a concrete example of a Ziegler-Natta type catalyst suitable for the production of the composition, i.e. one having a high overall activity as well as a good activity balance over a wide range of hydrogen partial pressures. Accordingly, the argument of the respondents that the information contained in the specification was only general and typical of the prior art fails to convince.

Common general knowledge and experimentation to be carried out by the skilled person

11. The patent in suit does not indicate the molecular weight distribution of the HMW fraction (apart from the information that it must have a lower molecular weight limit of 3500) and the molecular weight distribution of the LMW fraction. It is self-evident and undisputed that the skilled person would be left to find a suitable molecular weight distribution for those fractions, as well as their proportions in order to obtain a composition which meets the parametric definition of claim 1, i.e. the molecular weight distribution of the whole composition, its density and MFR₅ value.

12. The question is whether this additional task can be performed using common general knowledge and a reasonable amount of effort. The view of the appellant that the skilled person knows that the molecular weight of the polymeric chains can be adjusted both in the loop reactor and the gas-phase reactor by varying the amount of hydrogen (chain transfer agent) is also common ground. It is therefore accepted that varying the amount of hydrogen for preparing the HMW and LMW fractions, as well as varying their relative amounts would be an obvious measure to try for the skilled person when seeking to achieve the combination of parametric values claimed, in particular a combination of the molecular weight distribution defined by M_n , M_w , M_w/M_n of the whole composition and the lower molecular weight limit of the HMW fraction.

Experimental evidence in relation to sufficiency - Burden of proof

13. E23 was cited by the respondents as evidence that the use of a Ziegler-Natta type catalysts having a high overall activity as well as a good activity balance over a wide range of hydrogen partial pressures as recommended in the patent in suit did not necessarily result in obtaining a composition having a HMW fraction having a lower molecular weight limit of 3500 as required by claim 1, unless a treatment of the catalyst which was not described in the patent in suit was first carried out. It is undisputed that the compositions tested in that experimental report were prepared in a commercial dual tank slurry reactor, but not with a combination of loop reactor/gas-phase reactor connected in series as taught in the patent in suit. Having regard to the information in paragraph 25 of the patent

in suit and page 3, lines 5 to 17 of E4, from which it can be taken that slurry polymerisation in a stirred-tank reactor is not preferred among others as it involves solubility problems, it is concluded that E23 which does not relate to a polymerisation process using a combination of loop reactor/gas-phase reactor as taught in the patent in suit cannot demonstrate the unsuitability of other catalysts having a high overall activity as well as a good activity balance over a wide range of hydrogen partial pressures to produce the claimed composition.

14. E24 is an experimental report designed to demonstrate that the composition of Example 2 of the patent in suit complies with the requirement of claim 1, in particular with the feature that the HMW fraction of the multimodal polyethylene composition has a lower molecular weight limit of 3500. However, the indication in E24 concerning the molecular weight distribution, the use of a filler and the amount of comonomer used does not entirely match with the information provided either in Example 1 or Example 2 of the contested patent. Accordingly, serious doubts arise as to whether the tests results reported in E24 concern the material prepared in Examples 1 and 2 of the patent in suit with the consequence that those tests cannot be held to demonstrate that the compositions prepared in Example 1 and Example 2 of the patent in suit also fulfil the requirement of a HMW fraction having a lower molecular weight limit of 3500.
15. Experimental evidence showing a repeat of the process described in the patent in suit with the specific and preferred measures recommended therein has not been submitted during the whole opposition and appeal proceedings. There is therefore no suggestion that the

skilled person implementing the measures recommended in the patent in suit, i.e. which constitute selections within the broader teaching of E4, would not be able to adjust the conditions of the polymerisation, in particular the amount of hydrogen used in each reactor, and the proportions of HMW and LMW fractions so as to produce with a reasonable effort compositions meeting all the criteria of claim 1, including a HMW fraction entirely above the 3500 limit. The objections that particular compositions within the ambit of claim 1, namely (i) compositions having a M_w/M_n at the bottom of the claimed range, i.e. a narrow molecular weight distribution, a low molecular weight (i.e. a MFR_5 at the top of the claimed range) and a HMW fraction entirely above the 3500 limit and (ii) compositions having a M_w/M_n ratio as high as 30 and which meet the other parameters in the range claimed were not sufficiently disclosed, are also not corroborated by any evidence.

16. According to the case law (*supra*, II.C.8) the objection of lack of sufficient disclosure presupposes that there are serious doubts, substantiated by verifiable facts. Accordingly, in the absence in the present case of substantiating facts and corroborating evidence in support of the objection that the claimed subject-matter is insufficiently disclosed, in particular that the teaching provided in the specification cannot lead to the claimed subject-matter without unreasonable effort, the arguments of the appellants are mere speculations which cannot convince the Board.

Additional arguments relating to sufficiency

17. The respondents argue that Examples 1 and 2 of the patent in suit could not be repeated without undue

burden. The Board acknowledges that an exact repetition of the examples of the patent in suit in order to get the exact M_n , M_w and MFR_5 values reported therein could be a time consuming task for the skilled person, as it would require adjusting multiple process parameters not disclosed for those examples. However, the difficulty to provide an exact repetition of the examples of the patent in suit is in the present case not decisive for concluding a lack of sufficiency of disclosure of the claimed invention and can be left unanswered. Firstly, it is the sufficiency of disclosure of the combination of technical features of the invention, i.e. as defined by the terms of the claims (see Rule 43(1) EPC), which has to be assessed and not that of the specific exemplified embodiments, which are not in the present case the subject-matter of a claim. This means that adjusting the various process conditions to arrive at a product whose parametric values are within the broader ranges of values defined in claim 1 is a far less demanding task for the skilled person. Secondly, according to Rule 42(1)(e) EPC the description shall describe in detail at least one way of carrying out the invention claimed, using examples where appropriate, meaning that the presence of examples is not a mandatory requirement for meeting the requirement of sufficiency of disclosure. What counts is the information provided by the whole patent, including that provided by the examples, if any. In the present case, the examples confirm some of the technical information provided in the general part of the specification, in particular with respect to the use of a catalyst according to E18.

18. In conclusion the opponents did not succeed to demonstrate that a skilled person, on the basis of the information provided in the patent specification and

the general knowledge common in the art, was not able to carry out the invention as claimed in its whole extent without undue burden. Accordingly, no case has been made that the subject-matter of claim 1 lacks sufficiency of disclosure.

Remittal

19. Having so decided, the Board has not taken a decision on the whole matter, since the opposition division decided solely on the issue of whether claim 1 fulfilled the requirements of sufficiency of disclosure. As the opposition division has not yet decided on novelty and inventive step of the claimed subject-matter, the Board in agreement with the parties considers it appropriate to exercise the power conferred to it by Article 111(1) EPC to remit the case to the opposition division for further prosecution in order to enable the first instance to decide on the outstanding issues.

20. In order to avoid any misunderstanding having regard to the conclusion in above point 8, it is added that the mere indication on page 3 of the patent in suit that a lower limit of the HMW fraction of 3500 should be obtained in order to avoid a pressure pipe with poor strength merely suggests that Examples 1 and 2 of the patent in suit were meant by its drafter to concern embodiments of claim 1. This does not however mean that the Board has taken any decision on whether the compositions of Examples 1 and 2 have been shown to fulfil that requirement or on whether a causal link between the alleged benefit in terms of mechanical strength and the absence of copolymers below that limit has been established.

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 for further prosecution.

The Registrar:

The Chairman:



B. ter Heijden

D. Semino

Decision electronically authenticated