

Publication in the Official Journal Yes- / No

File Number: T 589/89 - 3.3.3

Application No.: 84 302 054.6

Publication No.: 0 121 396

Title of invention: Energy absorbing polyurethane compositions

Classification: C08G 18/14

D E C I S I O N  
of 5 February 1992

Applicant: NATIONAL RESEARCH DEVELOPMENT CORPORATION

Headword:

EPC Article 54, Rule 35(12)

Keyword: "Novelty (yes, after amendment) - Parameters implicitly disclosed"  
"Interpretation of Rule 35(12)"



Case Number : T 589/89 - 3.3.3 .

D E C I S I O N  
of the Technical Board of Appeal 3.3.3  
of 5 February 1992 .

Appellant : NATIONAL RESEARCH DEVELOPMENT CORPORATION  
101 Newington Causeway  
London SE1 6BU (GB)

Representative : Hamilton, Raymond  
Patent Department  
National Research Development Corporation  
101 Newington Causeway  
London SE1 6BU (GB)

Decision under appeal : Decision of Examining Division of the European  
Patent Office dated 2 May 1989 refusing European  
patent application No. 84 302 054.6 pursuant to  
Article 97(1) EPC.

Composition of the Board :

Chairman : F. Antony  
Members : C. Gérardin  
W. Moser

## Summary of Facts and Submissions

- I. European patent application No. 84 302 054.6 filed on 27 March 1984, claiming the priority of 30 March 1983 from an earlier application in the United States and published under the publication number 121 396, was rejected by the decision of the Examining Division 012 dated 2 May 1989.

That decision was based on a set of 38 claims filed on 19 August 1988, of which Claim 1, after a minor editorial amendment, read as follows:

"A polyurethane elastomer composition having a density of from 0.4 to 1 gm/cc, compression set of less than 5% and a recovery time of from 10 to 600 milliseconds, and being the reaction product of

- (a) a urethane-forming component comprising a compound containing at least four urethane-forming reactive sites and capable of forming stable complexes through unreacted urethane-forming reactive sites, an elasticising polyol selected from the group consisting of diols and triols, and
- (b) a diisocyanate in less than stoichiometric amounts."

Claims 2 to 34 were dependent claims directed to preferred polyurethane elastomer compositions according to Claim 1. Further, Claim 35 was an independent process claim for forming a polyurethane elastomer composition. Lastly, Claims 36 to 38 concerned various articles involving the use of a polyurethane elastomer according to Claim 7 or 8, which contained respectively a light-weight filler material or a plasticiser.

II. The main ground for that decision was lack of novelty with regard to the teaching of DE-A-1 694 667 (document (1)), which concerned polyurethane elastomers derived from the same starting compounds as in the application in suit; it followed that the physical parameters in the main claim could not be regarded as distinguishing features. Similar conclusions would arise from GB-A-2 075 531 (document (3)), since the microcellular elastomers described there were not excluded from the scope of the claimed subject-matter. Furthermore, EP-A1-29 021 (document (2)) disclosed shoe soles made of low density elastomer polyurethane filled with microspheres, which were free from permanent deformation.

Moreover, the scope of Claim 1 was found to be obscure in view of the presence of parameters which were not clearly defined in the description. A further ground of rejection, therefore, was non-compliance with the requirements of Article 84 EPC.

Furthermore, from a more formal standpoint it was pointed out that the Applicant had failed to bring the claims and description into conformity with Rules 27(1)(c) and (d), 29(1) and 35(12) EPC.

III. The Applicant (Appellant) thereafter filed a Notice of Appeal against that decision on 4 July 1989 and paid the prescribed fee at the same time. In the Statement of Grounds of Appeal filed on 28 August 1989 it was basically maintained that the subject-matter of the application was novel with regard to the teaching of document (1) as well as that of document (3), and that the terms "compression set" and "recovery time" were clear concepts for the skilled man. There was thus no reason to amend the claims.

On 23 January 1992 the Appellant nevertheless filed four new main claims to be considered as the basis of auxiliary requests. The first differed from Claim 1 according to the main request by the fact that it contained the following additional feature at the end: "wherein said unreacted urethane forming reactive sites are stabilised by chelation". The second differed from Claim 1 according to the main request by the fact that it contained the following additional passage at the end: "wherein said unreacted urethane forming reactive sites are stabilised by chelation with an ionic species introduced as part of an added catalyst system and selected from the group comprising 2-ethyl zinc hexanoate, phenyl mercury acetate, phenyl mercury laurate, cobalt octoate and butyl tin dilaurate". The third was directed to a polyurethane elastomer composition which was the reaction product of a specific composition. As to the fourth, it was drafted as a process claim for the preparation of a polyurethane elastomer composition.

IV. At the beginning of the oral proceedings held on 5 February 1992, the Board objected to the filing of these four auxiliary requests less than two weeks before the hearing and made it clear that, following the established practice of the Boards of Appeal, these requests may not be admitted into consideration if they were not clearly allowable. This led the Appellant to submit the following complete set of claims in replacement of the third auxiliary request filed on 23 January 1992:

"1. A polyurethane elastomer composition having a density of from 0.4 to 1 gm/cc, a compression set of less than 5% and a recovery time of from 10 to 600 milliseconds, and being the reaction product of (a) one part of a urethane-forming tetrol capable of forming stable complexes by chelation through

unreacted hydroxyl groups with ionic species added independently or provided in the reaction mixture by an organometallic urethane forming catalyst, 1 to 3 parts of an elasticising polyol selected from the group consisting of diols and triols, 0.2 to 2.0 parts of a light-weight filler material and 0 to 0.5 parts of a plasticiser, and

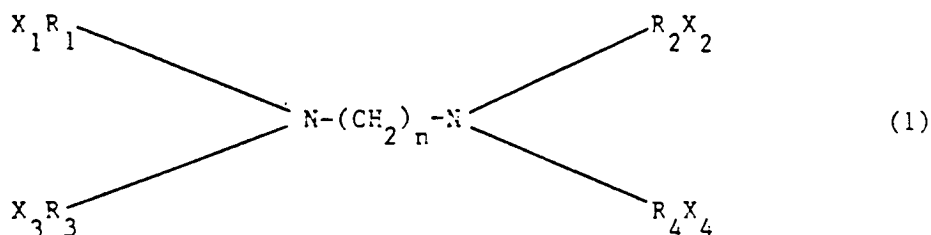
(b) an aromatic diisocyanate in an amount which is less than the stoichiometric requirement and such that the weight ratio of all other reactive components, plasticiser and filler to diisocyanate is from 4:1 to 10:1.

2. A polyurethane elastomer composition in accordance with Claim 1 characterised in that said ratio is from 6:1 to 7:1.
3. A polyurethane elastomer composition in accordance with either of Claims 1 or 2 wherein said recovery time is from 15 to 100 milliseconds.
4. A polyurethane elastomer composition in accordance with any of Claims 1 to 3 wherein said compression set is less than 1.5%.
5. A polyurethane elastomer composition in accordance with any of Claims 1 to 4 wherein said density is from 0.6 to less than 1 gm/cc.
6. A polyurethane elastomer composition in accordance with Claim 5 wherein said density is from 0.6 to 0.7 gm/cc.
7. A polyurethane elastomer composition according to any of the preceding claims wherein the catalyst is selected from the group consisting of 2-ethyl zinc

hexanoate, phenyl mercury acetate, phenyl mercury laurate, cobalt octoate or butyl tin dilaurate.

8. A polyurethane elastomer composition according to any of Claims 1 to 6 wherein said ionic species are selected from the group consisting of  $\text{Ag}^+$ ,  $\text{K}^+$ ,  $\text{Cu}^{++}$ ,  $\text{Hg}^{++}$  and  $\text{Ca}^{++}$ .
9. A polyurethane elastomer composition according to any of Claims 1 to 8 wherein the urethane-forming component of said polyurethane elastomer composition comprises 1 part tetrol, 2 parts elasticising diol, 0.5 parts filler and 0.25 parts plasticiser.
10. A polyurethane elastomer composition according to any of Claims 1 to 9 wherein said elasticising polyol is a diol.
11. A polyurethane elastomer composition according to Claim 10 wherein said diol is a polyalkylene ether glycol with molecular weight from 450 to 2000.
12. A polyurethane elastomer composition according to any of Claims 1 to 11 wherein the tetrol has a molecular weight from 170 to 450.
13. A polyurethane elastomer composition according to Claim 10 wherein said tetrol has a molecular weight of 200 and said diol has a molecular weight of 2000.
14. A polyurethane elastomer composition according to any of the preceding claims wherein said filler material is 40 to 700 microns in diameter and is selected from the group consisting of hollow glass spheres, silicon dioxide spheres, fly ash and sintered silicon dioxide powder.

15. A polyurethane elastomer composition according to Claim 14 wherein said filler material is coated with an adhesion promoter.
16. A polyurethane elastomer composition according to Claim 15 wherein said filler material is coated silicon dioxide fly ash spheres 70 microns in diameter and said plasticiser is dioctyl phthalate.
17. A polyurethane elastomer according to any of Claims 1 to 16 wherein said tetrol is of the following formula:



wherein n is an integer from 1 to 4; X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub> and X<sub>4</sub> are hydroxyl groups; and R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub>, which may be the same or different, are alkylene groups with from 1 to 3 carbon atoms.

18. A polyurethane elastomer composition according to Claim 17 wherein at least 20% of available hydroxyl groups remain unreacted.
19. A polyurethane elastomer composition according to any of Claims 1 to 18 wherein said diisocyanate is 4,4'-diphenylmethane diisocyanate.
20. A process for forming a polyurethane elastomer composition comprising:  
 (a) mixing 1 part of a tetrol capable of forming stable complexes through unsatisfied hydroxyl reactive



sites, 1 to 3 parts of an elasticising polyol selected from the group consisting of diols and triols, 0.2 to 2 parts of light-weight reinforcing filler selected from the group consisting of hollow glass spheres, silicon dioxide spheres, fly ash, and sintered silicon dioxide powder, and from 0 to 0.5 parts plasticiser;

(b) adding a diisocyanate in amounts such that the ratio of the weight of all other reactive components, filler and plasticiser to diisocyanate is in the range of from 4:1 to 10:1;

(c) allowing formation of urethane linkages involving less than 80% of the hydroxyl groups of said tetrol; and

(d) stabilising the remaining hydroxyl groups by formation of complexes such that the cured product has a density of from 0.4 to 1 gm/cc, a compression set of less than 5% and a recovery time of from 10 to 100 milliseconds.

21. An article of footwear having an energy absorbing element formed from a polyurethane elastomer according to any of Claims 1 to 19.
22. A shock absorbing insole formed from a polyurethane elastomer according to any of Claims 1 to 19.
23. A constrained layer vibration damper comprising a laminate of rigid exterior layers and an interior layer formed from a polyurethane elastomer according to any of Claims 1 to 19."

In the above set of claims minor corrections have been carried out by the Board.

V. In support of the patentability of the four requests directed to polyurethane elastomer compositions the

Appellant further emphasised during oral proceedings the difference with regard to the teaching of document (1). In the first place, the reference to rubbery character in that citation had to be interpreted as elastic properties, not as elastomer properties. Secondly, the submission that identical starting compounds led to identical final products was erroneous, since the starting compositions were not identical at all; in particular, the sterically hindered aromatic diamine, which was an essential ingredient of the compositions described in document (1), was not even mentioned in the application in suit. Thirdly, in that citation as well as in document (3) the functionalities were completely reacted to reach the clearing step and, thereby, to prepare a cured product; by contrast, in the application in suit some urethane forming reaction sites were left unreacted.

VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of one of the following documents:

- main request: Claims 1 to 31 submitted on 19 August 1988,
  - first and second auxiliary requests submitted on 23 January 1992,
  - third auxiliary request: Claims 1 to 23 submitted during oral proceedings (5 February 1992),
  - fourth auxiliary request submitted on 23 January 1992,
- each to be followed by a revised description.

## Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is admissible.

### Main request

2. The current wording of the claims does not give rise to any objections under Article 123(2) EPC.

With the exceptions of Claim 1, which incorporates the features of the reaction product of (a) and (b) as specified in Claim 7 originally filed, and of Claim 7 itself, which is now directed to the remaining feature, i.e. the incorporation of a light-weight filler, all the other claims are identical to the claims as originally filed.

3. Document (1) describes a curable polyurethane or polyureaurethane resin composition containing a porous filler, such as hollow glass microspheres having a diameter between 10 and 500  $\mu\text{m}$ ; these compositions exhibit a desirable combination of pressure resistance and flexibility properties, which makes them suitable for the fabrication of orthopedic articles, such as shoe inserts (page 2, paragraph 4 to page 3, paragraph 2). According to Example 2 a footwear material is prepared from (a) a polyol component containing a triol, two polypropylene glycols and N,N,N',N'-tetrakis-(2-hydroxypropyl)-ethylene-diamine as a tetrol, and (b) a sub-equivalent amount of an aromatic diisocyanate.

- 3.1 It may be true, as the Appellant argued during oral proceedings, that component (a) in Example 2 additionally contains a sterically hindered aromatic diamine, whereby a polyurethane containing urea linkages is produced; the use

of such diamine in order to increase the viscosity can even be regarded as one of the main features in the preparation of the polyurethanes disclosed in document (1) (Claim 2; page 4, line 13 to page 5, line 2). However, this embodiment is not at all excluded from the scope of Claim 1 according to the main request, wherein the urethane-forming component is merely defined as "comprising a compound containing four urethane-forming reactive sites and capable of forming stable complexes through unreacted urethane-forming reactive sites, and an elasticising polyol selected from the group consisting of diols and triols". There can be no doubt that this definition, which leaves open the possibility of further reactive ingredients, equally applies to component (a) in document (1), since the latter also "comprises" a tetrol and a long chain diol, both within the terms of the application in suit. It follows that, in the absence of a restrictive definition of the urethane-forming component in Claim 1, either by using the word "consisting", or by disclaiming the prior art aromatic diamine, the fact that in Example 2 of document (1) additional reactive ingredients are used cannot be regarded as a distinguishing feature.

3.2 Nor can the reference to an "elastomer" composition in Claim 1 according to the main request confer novelty to the claimed subject-matter. In contradistinction to the Appellant's contention, document (1) does indeed mention rubbery properties, which in the Board's view can only be interpreted as referring to elastomer properties.

In that citation, which is directed to both flexible and rigid materials, it is first recalled that the essential factor for the properties of the final product is the choice of the polyol component, in particular the functionality and the molecular weight thereof (page 6,

paragraph 2 to page 7, paragraph 1). The preferred polyols have generally molecular weights between 250 and 3000; but when soft, rubber-like properties are desired, a polyol of higher molecular weight should be used (page 10, paragraph 2 to page 11, paragraph 2). This requirement, which is met by the polyols used in Examples 1 and 2, also corresponds to the definition of the elasticising polyols in the application in suit, wherein polyalkylene ether glycols with molecular weights in the range of 450 to 2000 or more are preferred (compare page 7, lines 18 to 24).

Conversely, if one followed the Appellant's argument that the polyurethane compositions described in document (1) are not elastomers within the meaning of the application in suit, this difference would have to be attributed to specific features not mentioned in Claim 1 according to the main request, which would raise the problem of the wording of that claim; moreover, the elastomer character of these polyurethanes would then have to be regarded as a further parameter. This issue will be discussed in the next paragraph.

- 3.3 In view of the broad formulation of Claim 1 in the application in suit, the polyurethane compositions described in document (1) as well as the claimed compositions must both be regarded as the reaction products of (a) a urethane-forming component comprising a tetrol and a long chain diol, and (b) an aromatic diisocyanate in less than stoichiometric amounts. The comparison of the features which are defined positively, namely the tetrol, the diol, the diisocyanate and the molar ratio NCO:OH, reveals no difference in the starting compounds; the Board is aware that the use of a sterically hindered aromatic diamine, which has a major influence on the structure of the final product in the prior art, is nowhere envisaged in the application in suit, but this

is not reflected in the wording of the main claim, which, on the contrary, is drafted in such a way that other reactive ingredients, thus in particular such a diamine, are not excluded at all from the scope of that claim. For this reason, like the Examining Division, the Board takes the view that the reaction products must be the same; this means that all their properties, thus especially the density, the compression set, the recovery time as well as the elastomer character, must be the same. Consequently, the parameters mentioned in the preamble of Claim 1 according to the main request cannot distinguish the claimed compositions from those known from document (1).

This is not surprising if one considers that the polyurethane compositions in document (1) and in the application in suit are both used as shock absorbing elements in footwear, such as insoles (compare page 2, paragraph 4 of document (1) and page 1, lines 1 to 9 of the application in suit). It is self-evident that the requirements for this specific use must be the same in both cases; this means that, although document (1) does not express the properties of the polyurethane compositions in terms of density, compression set and recovery time as in the application in suit, the same ranges of values of these parameters must be regarded as implicitly disclosed in that citation.

- 3.4 For these reasons the subject-matter of Claim 1 according to the main request lacks novelty with regard to the teaching of document (1). Therefore, this request has to be rejected.

First and second auxiliary requests

4. No objection arises under Article 123(2) EPC having regard to the wording of the two main claims, since all the

amendments are adequately supported by the application as originally filed. The feature of the first auxiliary request requiring that the unreacted urethane forming reactive sites are stabilised by chelation corresponds to the subject-matter of original Claim 10.

This applies as well to the second auxiliary request. Further, the chelation with an ionic species introduced as part of an added catalyst system is disclosed in original Claim 12. As to the five catalysts suitable for that purpose, they are quoted in original Claim 16.

5. However, although the requirements of Article 123(2) EPC are met, the admissibility of these two requests raises a point of principle. In the decision T 153/85 "Alternative claims/AMOCO CORPORATION" published in OJ EPO 1988, 1, wherein similarly the Board had to deal with late filed claims, it is first recalled that alternative sets of claims should be filed with the grounds of appeal, or as soon as possible thereafter. When deciding on an appeal during oral proceedings, a Board may justifiably refuse to consider alternative claims which have been filed at a very late stage, if such alternative claims are not clearly allowable (Reasons for the Decision, point 2.1, paragraphs 2 and 3).

In the present case, the two single claims to be considered as the basis of the first and second auxiliary requests have been filed less than two weeks before the oral proceedings; moreover, only the main composition claim has been submitted, which is far from desirable if one considers that the application as originally filed and refused contained as many as 38 claims, including an independent process claim regarded as non-patentable in the decision of refusal. As to the wording of these single claims, the Board notes that the urethane forming

component (a) is still defined as "comprising", which is objectionable for the reasons given in point 3.3 above; it follows that these claims are not clearly allowable in the above sense. Therefore, the Board refuses to admit the first auxiliary request and the second auxiliary request into consideration.

Third auxiliary request

6. There are no formal objections to the claims of this request either, since they are adequately supported by the original disclosure.

6.1 Claim 1 can be regarded as resulting essentially from the incorporation into original Claim 1 of, first, original Claims 7 and 19 and, secondly, the method of introduction of the catalyst disclosed on page 8, lines 13 to 16. More specifically, the definition of component (a) has been modified in order to take into account that the urethane-forming reactive sites are now the hydroxyl groups of the tetrol. The formation of complexes by chelation corresponds to the subject-matter of Claim 10 as originally filed. Lastly, the addition of the article "a" before "compression set" is a mere editorial amendment which does not extend the content of the application as filed.

6.2 As to the dependent product claims 2 to 19, they correspond basically to Claims 30, 2, 4 to 6, 16, 17, 20 to 22, 24, 25, 27 to 29, 31, 32, 34 as originally filed, with their numbers and, where appropriate, appendancies adjusted, with the following exceptions:

Claim 3: the upper limit of 100 milliseconds for the recovery time is supported by page 4, line 3 of the application as filed;



Claim 9: the word "about" has been deleted before the amount of each ingredient of the composition;

Claim 17: the word "alkyl" has been changed into "alkylene". In the communication of 19 February 1988 the Examining Division had objected under point 4d that according to formula (1) the radicals  $R_1$  to  $R_4$  were difunctional and hence could not be alkyl groups. In the absence of any specific compound in the description (page 7, lines 8 to 17) or in the examples, which simply refer to a tetrol of general formula (1), one can rely on the definition of the corresponding compounds in document (3), from which it clearly appears that the nitrogen atom and the hydroxyl group are separated by an alkylene chain (see page 3, lines 4 to 13 of that citation). The molecular weights which can be calculated on that basis are fully in line with the range of 170 to 324 mentioned in the application in suit. Therefore, the Board regards the amendment above as an allowable request for a correction of an obvious error within the meaning of Rule 88 EPC.

6.3 The independent Claim 20 corresponds to original Claim 35, wherein it has been specified that the compound having at least four urethane-forming reactive sites is a tetrol and that the urethane-forming reactive sites are hydroxyl groups. Further, the ratio of weight of all other reactive components, filler and plasticiser to diisocyanate has been brought in line with the ratio defined under (b) of the main composition claim.

Lastly, with the exception of the change of the article "the" into "a", Claims 21 to 23 correspond to Claims 36 to 38 as originally filed, with their numbers and appendancies adjusted.

7. The subject-matter of Claims 1 and 20, the latter being drafted as an independent process claim involving the use of a composition defined practically in the same manner as in Claim 1, is novel with regard to the teaching of the documents cited in the search report.

7.1 Since the composition according to Claims 1 and 20 is now specifically defined, the word "comprising" being no longer used, these claims are no longer anticipated by the composition of Example 2 of document (1), which contains a sterically hindered aromatic diamine, whereby a polyurethane with urea linkages is produced, which is different from the reaction product now claimed in the application in suit.

7.2 Document (3) describes a process for preparing a microcellular polyurethane foam comprising reacting an organic polyisocyanate with a polyalkylene ether polyol, a tetrol, a catalyst - all these compounds being possibly defined and used in amounts within the terms of the application in suit - as well as a chain extender, which is typically a difunctional reactant of low molecular weight, such as a diamine or a diol (Claim 1 in combination with Examples 7 to 18; page 3, lines 29 to 38). Although the incorporation of plasticisers and inorganic fillers is also contemplated (page 3, lines 41 to 45), novelty of the claimed subject-matter can thus be acknowledged at least on the basis that the reaction product in the prior art is a foam requiring the use of a chain extender.

7.3 Document (2) relates to a conventional polyurethane polymer encapsulating microspheres in order to provide a product having a reduced density suitable for the fabrication of shoe soles (Claims 1 to 7). In particular,

nothing is said about the use of tetrol within the terms of the application in suit.

- 7.4 It follows that novelty can be acknowledged on the sole basis of the compositional features.
8. The decision under appeal also mentions Article 84 EPC as ground of refusal of the application.

In that respect, the Board notes, like the Examining Division, that the term "recovery time" in Claims 1 and 20 is not properly defined in the description of the application in suit (page 5, line 21 to page 6, line 3). The sole indication of a weight of 180 pounds is meaningless if the size (area) of the sample of the polymer material on which that practical load is applied is not mentioned. Consequently, although this parameter should not be deleted from these two claims (Article 123 (2) EPC), it should be regarded as meaningless to the issue of inventive step. Since, for the reasons given above, novelty can be acknowledged on the basis of compositional features only, the presence of that parameter in the preamble cannot be regarded as an obstacle to a clear definition of the scope of Claim 1.

As to the term "compression set", it is defined on page 5, lines 17 to 20 of the description with reference to a generally accepted test method, which should be unobjectionable under Article 84 EPC.

In the light of the above interpretation of Claim 1, it can thus be concluded that the requirements of Article 84 EPC are met.

9. It follows that the present wording of the claims submitted as third auxiliary request overcomes the two

grounds of refusal of the application, i.e. non-compliance with the requirements of Articles 54 and 84 EPC. To that extent, these claims are thus clearly allowable. It remains consequently to be examined whether the subject-matter as now defined in Claims 1 and 20 involves an inventive step with regard to the documents cited in the search report. For that purpose, the case is thus remitted to the Examining Division for prosecution of the examination procedure.

10. In addition to the actual grounds of rejection, the decision under appeal stated that the description of the application in suit was defective in several respects. The Appellant will thus be invited, should the Examining Division so wish, to acknowledge the state of the art (Rule 27(1)(c) EPC); this can only be of help for the definition of the technical problem underlying the application in suit, which itself is essential for the issue of inventive step to be decided. Further, units of weights and measures should be expressed in terms of the metric system (Rule 35(12) EPC).
11. In view of the difficulties met by the Examining Division when asking the Appellant to comply with the requirements of Rule 35(12) EPC, it has to be determined how this provision ought to be interpreted.
  - 11.1 Following the general requirement in the first sentence of the rule that "units of weights and measures shall be expressed in terms of the metric system", and the requirement in the third sentence of the English version that the "temperatures shall be expressed in degrees Celsius", the fifth sentence of the English version specifies that for "the other physical values", which the Board interprets to mean the physical values other than temperatures, "the units recognised in international

practice shall be used". The question arises thus whether and to what extent the system of units recognised in international practice differs from the metric system.

11.2 For that purpose the Board has made some investigations which revealed the following documents:

- (i) Chambers Science and Technology Dictionary, The Chaucer Press, Bungay, Suffolk (1974), page 752, article "metric system";
- (ii) Grand Larousse Encyclopédique, Libraire Larousse, 1964, Volume 10, articles "système" and "unité";
- (iii) Encyclopaedia Universalis, Encyclopaedia Universalis France, 1980, pages 855 and 856;
- (iv) La Nuova Enciclopedia delle Scienze Garzanti, Garzanti Editore, 1988, page 1319, article "Sistema Internazionale";
- (v) The new Encyclopaedia Britannica, 15th edition, Volume 6, page 354, article "International System of Units", and Volume 8, page 73, article "Metric System";
- (vi) Grote Winkler Prins Encyclopedie, 8th edition, Elsevier Amsterdam, Volume 8, pages 95 to 97, article "Eenhedenstelsel";
- (vii) Focus, Almqvist & Wiksell Förlag, Stockholm, 1979, page 386, article "Mättsystem";
- (viii) Meyers Enzyklopädisches Lexikon, Lexikon Verlag, Volume 12, page 661, article "Internationales Einheitensystem";

- (ix) Die neuen Einheiten by H. Frost, 1st edition, Berlin Elitera, 1977, pages 45 to 49;
- (x) DIN Norm 1301, part 3;
- (xi) Le Système International de Mesures by R. Allard, Gauthier-Villars Paris, 1963, Propos de présentation;
- (xii) Plastic Card distributed by Hoechst, which gives a table of the metric system units no longer allowed as well as the various dates when this became official;
- (xiii) Enciclopedia della Scienza e della Tecnica, Arnoldo Mondadori Editore, Milano, 1980, Volume XII, pages 537, article "Unità di misura";
- (xiv) Tool and Manufacturing Engineers Handbook by D.B. Dallas, Mc Graw-Hill Book Company, third edition (1976), Chapter 44, The Metric System and SI Units, page 44-1; and
- (xv) Van Nostrand's Scientific Encyclopedia, Sixth Edition (1983), Van Nostrand Rheinhold Company, Volume II, page 2888, article "Units and Standards".

These documents show that

- there have been two common measurement systems in the world, the metric system and the (inch-pound) system customary in the Anglo-American countries. A transition is planned in the United States and in Canada to a

specific type of metric usage called the International System of Units (SI) (Documents (xiv) and (xv));

- advance in science technology fostered the development of successive systems of measurements within the framework of the metric system, in particular the C.G.S. and M.K.S./M.K.S.A. systems, which were the main systems until the establishment of SI units now universally adopted (Documents (i) to (vii), (xi), (xiii) and (xv));
- the use of the International System of Units based on seven fundamental units is not optional, but compulsory (all documents);
- not any possibly well known unit expressed in terms of the metric system qualifies as a SI unit (Documents (ii), (vi), (viii), (ix), (x), (xii) to (xv)).

11.3 Apart from the ratification in individual countries, the Council Directive of 27 July 1976 No. L 262/204 published in the Journal officiel des Communautés européennes of 27 September 1976 (Document xvi) extends to all the EEC countries the obligation to use the SI units mentioned in the Annex, Chapter A from 21 April 1978 (Article 1, paragraph 1) and further specifies that units mentioned in Chapters B and C of that Annex, which both include well known units of the metric system which are not SI units, will no longer be allowed after respectively 31 December 1977 and 31 December 1979 (Article 1, paragraphs 2 and 3). Incidentally, the Guidelines for Examination, C-II, Annex 1 (January 1992) make an explicit reference to that Council Directive and reproduce the whole Chapter A including the SI units "the use of which must be made mandatory as from 21 April 1978 at the latest".

11.4 It is true that, in addition to these official SI units, some units simply expressed in terms of the metric system may still be allowed, as it appears from Documents (ii), (vi), (ix), (x), (xiii), (xv) and (xvi). However, such units are defined as exceptions in that, like the litre or the bar, they correspond to decimal multiples and submultiples of SI units, or, like the tex, electronvolt, dioptre and metric carat, they pertain to specialised fields, their value, expressed in SI values, not being exactly known for all of them.

It follows that the "other physical values" comprise a vast majority of SI units and a small group of heterogeneous units simply expressed in the metric system, both categories being officially allowed and thus recognised in international practice.

11.5 The general requirement that "units of weights and measures shall be expressed in terms of the metric system" can thus be interpreted in two different manners. In the first place, that sentence could simply be meant to exclude the units of the "customary" (inch-pound) system which still coexists with SI units in some countries, as underlined in the two documents of American origin. In the second place, that sentence could mean that any unit in the metric system could be used. In the Board's view, the latter interpretation is not likely for both practical and legal reasons. Whereas the advantages in terms of simplicity of the metric system as a decimal system, i.e. as a rational system based on multiple and submultiples of 10, are generally underlined, none of the above-considered documents mentions the metric system as the system of units wherein physical units should be expressed. This is not surprising, since the sole reference to metric system without further specification, i.e. C.G.S., M.K.S./M.K.S.A. or SI, is rather vague in that it would



regard any metric system unit as suitable; this would result in allowing the use of a very broad system without specific reference units - for instance the gram and the ton would be equally suitable as a basic weight unit - and the situation arising would be exactly that existing at the end of last century before the first attempts to define coherent systems of measurement. Besides, this would lead the EPO to grant patents containing units contravening the national legislation of the Contracting States as well as the EEC Directives.

For these various reasons, the Board concludes that the first requirement is to be interpreted as the exclusion of the (inch-pound) system as a general system to express physical values.

As to the requirement that "for the other physical values, the units recognised in international practice shall be used", it simply follows from point 11.4 above that as a general principle the SI units should be used, with the exception of some units concerning specialised fields. This interpretation is in particular compatible with the wording of the rule, wherein no general reference to SI units may be made, since the units recognised in international practice encompass SI units as well as simple metric system units in special areas.

From the foregoing, it follows that in the present case tensile strength, pressure and tear strength should be expressed in SI units (Guidelines, C-II, Annex).

- 11.6 The Board is aware that this conclusion is not in line with the decision T 561/91 of 5 December 1991 (to be published), which regards the use of the metric system as such, i.e. without any further specification or reference to a coherent system, as a sufficient condition to comply

with the EPC. For the reasons given above, the Board in its composition in the present case (= "this Board") cannot follow such an interpretation of the first sentence of Rule 35(12) EPC, which would go against the trend towards always more coherent systems of measurement and would result in practice in many non-official units being allowed in examination procedure; the EPO would thus have its own system of units, which would contravene the legislation of the Contracting States and the EEC Directives. In the view of this Board, this is an essential argument, for, even if two interpretations of the first sentence of Rule 35(12) EPC were equally plausible, the one not contravening the national and international legislations should clearly prevail. It follows that the use of the metric system can at most be regarded as a necessary condition deemed to exclude the customary (inch-pound) system.

This Board cannot follow either the restrictive interpretation of the fifth sentence of Rule 35(12) EPC made in that decision. According to point 4 of the Reasons for the Decision, the physical values to be expressed in internationally recognised units would only be related to "some aspects of physical measurement which do not form part of a recognised system, but are nonetheless recognised in specific industries, or specific areas of technology". In the view of this Board, on the contrary, the above documents demonstrate that the units recognised in international practice concern all the fields and comprise a majority of SI units together with few units related to specialised fields. This means that SI units, when available, should be used systematically; this also means, as noted above, that Rule 35(12) EPC already contains an implicit reference to SI units.

Fourth auxiliary request

12. In view of the conclusion of point 9 above, it is not necessary to consider the main claim submitted as the basis of the fourth auxiliary request.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The main request is rejected.
3. The first and second auxiliary requests are not admitted into consideration.
4. The case is remitted to the Examining Division with the order to continue the examination on the basis of the claims of the third auxiliary request and a description yet to be revised and adapted.

The Registrar:

The Chairman:

  
E. Gorgmaier

  
F. Antony

CG 21.08.92  
Wheeler 21.8.92