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Datasheet for the decision of 31 January 2014

Case Number: T 2172/11 - 3.2.01

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Title of invention:
Airbag system

Patent Proprietor:
NIHON PLAST CO., LTD.

Opponent:
Autoliv Development AB

Headword:

Relevant legal provisions:
EPC 1973 Art. 54(1), 56, 111(1)
EPC Art. 123(2)

Keyword:
Novelty - Main Request, Auxiliary Requests 1 and 3 (no)
Amendments - Auxiliary Request 2 (intermediate generalisation)
Inventive step - Auxiliary Request 4 (yes)

Decisions cited:

Catchword:

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Case Number: T 2172/11 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 31 January 2014

Appellant: (Patent Proprietor)	NIHON PLAST CO., LTD. 3507-15 Yamamiya Fujinomiya-shi Shizuoka 418-0111 (JP)
Representative:	Grünecker, Kinkeldey, Stockmair & Schwanhäusser Leopoldstrasse 4 80802 München (DE)
Respondent: (Opponent)	Autoliv Development AB Vallentinsvägen 22 S-447 83 Vargarda (SE)
Representative:	Müller, Karl-Ernst Patentanwälte Becker & Müller Turmstrasse 22 40878 Ratingen (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 25 July 2011 revoking European patent No. 1559620 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	G. Pricolo
Members:	W. Marx
	P. Guntz

Summary of Facts and Submissions

I. On 4 October 2011 the appellant (patent proprietor) lodged an appeal against the decision of the opposition division, posted on 25 July 2011 revoking European patent No. 1 559 620, and paid the appeal fee. The statement setting out the grounds of appeal was received on 10 November 2011.

In its decision the opposition division held that the subject-matter of claim 1 as granted was not new over document D2 (EP 1 626 881 B1; prior art according to Article 54(3) EPC), that Auxiliary Requests 1 and 2 filed on 13 April 2011 did not fulfil the requirements of Article 123(2) EPC, due to added feature "... wherein the gas supply portion (22) is arranged opposite to the end (64) of the partition (60) ...", and that, starting from the closest prior-art document D3 (US 6,349,964 B1), the subject-matter of claim 1 of Auxiliary Request 3 filed during oral proceedings did not fulfil the requirements of inventive step (Article 56 EPC 1973).

II. In the oral proceedings, held on 31 January 2014, the appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (Main Request) or, in the alternative, on the basis of one of Auxiliary Requests 1 to 3, submitted with the statement of grounds of appeal, or of Auxiliary Request 4, submitted during oral proceedings of 31 January 2014.

The Respondent (Opponent) requested that the appeal be dismissed.

III. Claim 1 as granted reads as follows (the numbering of the features in **bold** has been added by the board and corresponds to the numbering used in the contested decision):

a) An airbag system (11) comprising: an airbag (14) including therein a plurality of chambers (61,62)
b) defined by a partition (60),
c) and a gas introduction portion (65) through which gas is introduced into a plurality of chambers (61,62);
d) an inflator (12) having a gas supply portion (22) and
e) arranged opposite to an end (64) of the partition (60) so as to supply gas to the gas introduction portion,
f) and a gas guide member (37)
g) disposed in the gas introduction portion (65)
h) and airtightly connected to the end of the partition (60)
i) so as to define a passage between the gas guide member (37) and the gas supply portion (22) of the inflator so that gas is flowable through the passage,
j) the gas guide member (37) being arranged to distribute gas from the gas supply portion (22) of the inflator into the plurality of chambers (61,62),
k) wherein fluid communication between the plurality of chambers (61,62) is allowed only through the passage.

Claim 1 according to both Auxiliary Requests 1 and 2 was amended by inserting further feature **e1)** after feature **e):**

e1) wherein the gas supply portion (22) is arranged opposite to the end (64) of the partition.

Claim 1 according to Auxiliary Request 2 comprises, in addition, further feature **l)** at the end:

l) and the amount of gas distributed to the upper chamber (62) is different from the amount of gas distributed to the lower chamber (61).

In comparison to claim 1 as granted, claim 1 according to Auxiliary Request 3 has been amended by replacing feature **a)** with feature **a')** which now refers to a side collision air bag system:

a') A side collision air bag system (11) comprising: an airbag (14) including therein a plurality of chambers (61,62).

Furthermore, additional feature **b1)** has been inserted after feature **b)** and feature **l')** added at the end:

b1) said chambers comprising a hip restraining chamber (67) and a chest restraining chamber (62), which is above the hip restraining chamber (67),

l') and the amount of gas distributed to the hip restraining chamber (61) is a main flow and the amount of gas distributed to the chest restraining chamber (62) is an auxiliary flow.

Claim 1 of Auxiliary Request 4 is identical to claim 1 of Auxiliary Request 3, except for feature **l'')** which replaces feature **l'):**

l'') and the gas distributed to the hip restraining chamber (61) is a main flow and the gas distributed to the chest restraining chamber (62) is an auxiliary flow, wherein the main flow is larger in flow rate than the auxiliary flow, and the hip restraining chamber is smaller in volume than the chest restraining chamber.

IV. The appellant's arguments may be summarised as follows:

In the context of the patent in dispute, the purpose of the invention was to allow a rapid entry of gas into the hip restraining chamber 61 and the chest restraining chamber 62. This was achieved by placing the gas in the gas introduction portion, whereby gas left the inflator and entered the chambers immediately with the gas guide. Thus, the inventive airbag system comprised only one gas introduction portion and one gas guide. The gas introduction portion (e.g. reference sign 65 in Figures 1, 2, 12) according to feature **c)** defined the area where gas left the inflator and which was directly connected to the volume of the airbag chambers to allow a direct and rapid entry and distribution of gas into the airbag. Feature **e)** defined that gas was supplied – via the gas supply portion opposite to the end of the partition - to the gas introduction portion which already formed part of the airbag chambers. Reading claim 1 together with the description, and contrary to the prior art, a gas guide member of annular shape was disposed in the gas introduction portion according to features **f)**, **g)**, airtightly connected to the end of the partition (feature **h)**) so as to define a passage according to feature **i)**. In particular, the term "so as to supply gas to the gas introduction portion" suggested a small area already connected to the airbag chambers.

Contrary to this, while acknowledging that in D2 the gas outlet apertures 18 were situated opposite to the end of the partition, D2 disclosed a pre-chamber formed by the cylindrical gas deflector 15 where pressure built up initially and where two gas flows leading upwards and downwards were formed before entering the

chambers, i.e. D2 showed a different design where gas was not supplied directly into a single gas introduction portion. By virtue of the pre-chamber, D2 disclosed two gas introduction portions defined by deflector 15, separated from each other, and no gas guide in the sense of the present invention. The gas guide member in D2 was a long tube with two cut-out portions at both ends, whereas according to the inventive construction the gas guide member was a short guiding element. For the person skilled in the art, the gas guide member 37 as described in the contested patent did not represent a pre-chamber but allowed the rapid entry of gas into both chambers of the airbag. According to D2, the flow of gas passed through a passage between the peripheral surface of the cylindrical inflator and the inner surface of the deflector, and no such gas flow was shown in the present invention. Moreover, a strap 21 was wrapped around the rear part of the airbag disclosed in D2 and fastened to urge the end of the partition into contact with the deflector, thereby producing buckles, whereas claim 1 (feature **h)**) required the gas guide member to be airtightly connected to the end of the partition. This was important in view of the high pressure involved and was realised by specific means (see Figure 3). The gas introduction portion, in particular the arrangement of the gas introduction portion 65 in combination with the inflator 12 and the gas guide member 37, was essential for the function of the present invention and clearly defined in claim 1. The skilled person would understand the difference between the pre-chamber disclosed in D2 and the gas introduction portion as claimed.

Since document D2 failed to disclose features **c)**, **e)**, **f)**, **g)**, **i)** and also feature **h)** (further underlined by

feature **k)**), which provided a synergetic effect different from what was achieved in the prior art, the subject-matter of granted claim 1 was new over D2.

D3, like D2, also disclosed a pre-chamber 40 defined by a tubular housing, two gas introduction portions and no gas guide in the sense of the present invention which allowed rapid and immediate flow of gas into the chambers. Analogous to D2, a deflector covered the intermediate section of the inflator 36, and the flow of gas passed through a passage between the peripheral surface of the cylindrical inflator and the inner surface of the deflector. Moreover, D3 failed to disclose a gas guide member airtightly connected to the end of the partition. The subject-matter of granted claim 1 was therefore new and inventive over D3.

Documents D2 and D3 also failed to disclose a gas supply portion arranged opposite to the end of the partition as claimed by feature **e1)** according to Auxiliary Request 1.

As to feature **1)** added in claim 1 of Auxiliary Request 2 and objected to for inadmissible generalisation, column 3, line 56 to column 4, line 2 (or paragraph [0035]) of the opposed patent – where this feature was disclosed in connection with the conical shape of the gas guide member 37 - had to be regarded only as an example. A guiding element distributing different amounts of gas to the upper and lower chamber was also found in paragraphs [0065] or [0082] of the opposed patent. However, a gas guide 37 inclined with respect to the gas supply portion was only mentioned in paragraph [0035].

The terms "main flow" and "auxiliary flow" used in claim 1 of Auxiliary Request 3 (feature **1')**) indicated two flows with different directions and rates, i.e. a main flow going downward to the hip restraining chamber and an auxiliary flow going upward to the chest restraining chamber, whereas D3 (see Figure 2) showed only one flow direction. According to D3 (Figure 2), three upper openings 42 and only two lower openings 44 were provided, and the upper airbag chamber was larger than the lower airbag chamber. Hence, a more rapid pressure rise in the lower chamber was achieved by means of a smaller amount of gas, i.e. by a lower volume flow. There was no hint in D3 that the lower chamber received a larger main flow and the upper chamber a smaller auxiliary flow, as described in the contested patent (see e.g. paragraph [0082]), which was contrary to the normal distribution of gas flow (due to a lower flow resistance in the larger upper chamber).

Claim 1 according to Auxiliary Request 4 clearly defined a main flow larger in flow rate than the auxiliary flow (as disclosed in column 12, lines 11 to 12 of the patent specification; also in paragraph [0035]) and explicitly stated that the hip restraining chamber was smaller in volume than the chest restraining chamber, although considered implicit for side airbag systems where the hip restraining chamber was filled more quickly. It was not considered necessary to also state that the main flow and the auxiliary flow were supplied directly to the respective chambers, because all embodiments showed such direct supply. The present invention tried to change the distribution of gas flow to both chambers, contrary to the normal distribution, and solved the problem of improving the filling of the side airbag. This inventive idea was neither known nor obvious from D3.

V. The arguments of the respondent may be summarised as follows:

When subdividing claim 1 into individual features, the technical teaching a skilled person would infer from the claim's content when assessing the prior art had to be taken into account. Due to the airtight connection between the gas guide member and the partition, and the passage defined between the gas guide member and the gas supply portion of the inflator, no exchange of gas was possible between the two chambers during inflation, because the only passage existing between both chambers was filled by the gas supplied by the inflator. On completion of the inflation process, gas flow was allowed only through this passage.

Document D2 showed an airbag system with a similar construction and design, comprising a gas guide member disposed in the gas introduction portion, airtightly connected to the end of the partition (see column 3, lines 34 to 42 and lines 57 to 58) so as to define a passage between the gas guide member and the gas supply portion of the inflator (see column 3, lines 52 to 56), so that gas could be distributed to the chambers and fluid communication between the chambers was only allowed through the passage after the airbag had been deployed (see column 3, line 58, to column 4, line 3). The gas introduction portion (feature **c)**) was not further defined in claim 1, and also the contested patent (see column 4, line 42) referred to the gas introduction portion only as a space serving as an inflator accommodation. Such space existed also between the end of the partition and the edge of the airbag in D2. Further passages in the description of the contested patent even made clear (see column 5, line 2

and lines 15 to 17) that the gas introduction portion was not restricted to a small area. Reading features **d)** and **e)** together, the arrangement "opposite to the end of the partition" related to the inflator (not to the gas supply portion), as known from D2. The tubular deflector 15 in D2 represented a gas guide member disposed in the gas introduction portion (features **f)**, **g)**) which distributed gas into the two chambers. A rapid supply of gas to the chambers was possible because of the short distance between gas outlets 19 and 20 in D2, similar to what was shown in Figure 12 of the contested patent. The two cut-outs 19, 20 provided at element 15 in D2 (i.e. at the "gas guide member") were not to be considered as two gas introduction portions. The wording of granted claim 1 did not contain any specifications whatsoever with respect to the structural design – short or long – of the gas guide member or with respect to a special flow of gas resulting from such a design. Moreover, it was not apparent how a cylindrical object, such as the deflector 15 used in D2 for distributing the gas, be discernible as a "pre-chamber" having a different function than the truncated-cone shape of the gas guide member in the contested patent (see column 3, lines 53 to 55). Since the deflector 15 had a larger diameter than the inflator, a passage existed between the gas guide member 15 and the gas supply portion of the inflator in D2 (feature **i)**). As to the airtightness according to feature **h)**, D2 mentioned (see paragraph [0023]) that the chambers were "substantially sealed from each other", and a backflow of gas was only possible through the deflector later, after the airbag had been deployed. Moreover, an "airtight connection", which was not further defined in claim 1, was a basic requirement for the airbag, and the sealing known from D2 was sufficient to achieve different pressures. Even

in the contested patent, formation of buckles could not be avoided, due to the fixture for holding the airbag from the outside, realised by a clamp surrounding the truncated-cone portion of the gas guide member. The contested patent also showed (see embodiments according to Figures 10 and 12 and paragraph [0062]) a cylindrical gas guide as in D2 and a textile press fit in lieu of the clamp. Therefore, the subject-matter of granted claim 1 was not new over D2.

In document D3, although the term "pre-chamber" was used for a path supplying gas from the gas supply portion of the inflator to the chambers of the airbag, the tubular housing 30 disposed in the space or - within the meaning of the contested patent – in the "gas introduction portion" between the end of partition 24 and the outer edge of the airbag represented a gas guide member distributing gas into the chambers.

The further feature inserted in claim 1 of Auxiliary Request 1 did not add anything substantive.

Different amounts of gas distributed to the upper and lower chamber, as specified by feature **1)** according to Auxiliary Request 2, were disclosed in the contested patent (see column 3, line 56 to column 4, line 2) only in connection with the conical shape of the gas guide 37. Hence, the added feature represented an inadmissible generalisation. This view was supported by paragraph [0056] in the contested patent, showing that the distribution rate of gas to the chambers was adjusted by adjusting an angle of inclination of the gas guide 37. Paragraph [0065], like paragraph [0082], merely mentioned a main flow and an auxiliary flow divided vertically at a desired distribution rate.

Feature **b1)** of claim 1 of Auxiliary Request 3 was already known from document D3. As regards additional feature **l')**, the contested patent described (see e.g. paragraph [0055]) that the hip restraining chamber was deployed with the gas pressure increasing quickly and having a greater peak value than the chest restraining chamber. Since claim 1 did not define the dimensions of the two chambers, the desired state as described in the contested patent was only reached when the hip restraining chamber was smaller in size than the chest restraining chamber. This concept of achieving different deployment speeds and pressures in separate chambers was also known from D3 (see column 4, line 64 to column 5, line 5), showing that the cross-section of inflow openings 42 and 44 was adjusted so that a higher filling speed and pressure was achieved for the lower chamber. D3 did not only show a single direction of gas flow; gas flowing out of opening 38 was distributed to the openings 42, 44 associated with the two chambers. Since the gas flow via opening 44 to chamber 22 was supposed to be greater than the gas flow to chamber 20 (see D3, column 4, line 66 to column 5, line 2), a "main flow" and an "auxiliary flow" within the meaning of claim 1 was known. In particular, according to D3, the free cross-section of opening 44 was compared to a fictitious value for achieving the same internal pressure in both chambers and then selected to be greater, so the lower chamber was filled more quickly. D3 even disclosed a control unit for altering the free cross-section of the first and second inflow openings 42, 44 (see column 5, lines 14 ff.). Due to the full compliance of the technical teaching of D3 with the contested patent, even though features as claimed might not appear literally in D3, the

disclosure of D3 was novelty-destroying for the subject-matter of claim 1 of Auxiliary Request 3.

In the event that in D3 the hip restraining chamber was larger than the chest restraining chamber, the additional features of claim 1 according to Auxiliary Request 4 were necessarily known from D3. Moreover, D3 already showed control means for adjusting gas flow to both chambers. When faced with the problem of filling the lower hip restraining chamber more quickly depending on e.g. the occupant's size, a possible solution was known from D3 by the adjustment of gas flow.

Reasons for the Decision

1. The appeal is admissible.

2. *Claim 1 as granted – novelty (Article 54(1) EPC 1973)*

The issue of novelty with regard to claim 1 as granted hinges on the interpretation of the terms "gas introduction portion", "gas guide member" and "airtightly connected to the end of the partition" as specified in features **c)**, **e)**, **f)**, **g)**, **h)** and **i)**.

According to feature **c)** the "gas introduction portion" is specified as the part of the airbag "through which gas is introduced into a plurality of chambers", without further defining its extension or limitation in space. Moreover, the description of the contested patent refers to the "gas introduction portion" as an "inflator accommodation" (see column 4, line 42) and explicitly mentions (see column 5, lines 1 to 2 and lines 15 to 17) "mounting holes 71, 72 formed at the

gas introduction portion 65" and "a reinforcing cloth 76 arranged in the vicinity of the gas introduction portion 65", which definitely suggests (see Figure 2) that the "gas introduction portion" is represented by a larger area of the airbag situated between the partition 60 and the opening or rear end 58 in the contested patent. A gas introduction portion within this meaning can be identified in document D2 between the end of partition 5 and the rear part 6 of the airbag, rising up to the cut-outs 19, 20 in deflector 15. In particular, the board does not follow the appellant's assertion that D2 showed two gas introduction portions defined by the deflector 15, presumably referring to the two cut-outs 19, 20 at deflector 15 which open directly into the respective upper and lower chamber. The appellant stressed that, in the context of the contested patent, the gas introduction portion was defined as the area where gas left the inflator and entered the chambers immediately and which was directly connected to the volume of the airbag chambers to allow a direct and rapid entry of gas. However, in the board's understanding, as mentioned above, this is also true for the gas introduction portion disclosed in D2.

Taking features **d)** and **e)** together, the board is convinced that the conjunction "and" which combines both features indicates that the inflator (and not the gas supply portion) has to be arranged opposite to the end of the partition, which is known from D2 (see Figure 1).

With regard to the gas guide member disposed in the gas introduction portion as defined by features **f)** and **g)**, claim 1 does not specify at all the length, size or structural design of the gas guide member. Moreover, as

argued above, the gas introduction portion as claimed is represented by a larger area within the airbag accommodating the inflator. The board cannot follow the appellant's interpretation that the gas guide member had to be a short guiding element or of annular shape. The wording of claim 1, again relying on the interpretation of the gas introduction portion as discussed above, also does not preclude the gas guide member as claimed from being by a long cylindrical object or a so-called "pre-chamber". Therefore, the board finds that the tubular deflector 15 known from D2 represents a gas guide member disposed in the gas introduction portion as specified by features **f)** and **g)**, supplying (via cut-outs 18, 19) gas directly and therefore rapidly to the chambers of the airbag. As the deflector 15 in D2 has a larger diameter than the inflator, which has gas outlet apertures 18 representing the gas supply portion, D2 also shows a passage between the gas guide member and the gas supply portion of the inflator as required by feature **i)**.

Lastly, the appellant argues that a gas guide member as required by feature **h)**, i.e. airtightly connected to the end of the partition, was not known from D2. However, claim 1 does not define in more detail further characteristics of the airtightly connected parts, e.g. by defining a degree of pressure loss over time or any specific means for realising such airtight connection. Nor is there anything in the disclosure of the patent specification to indicate that a 100% gastight sealing is meant. In the contested patent, different embodiments are disclosed with regard to such airtight connection between the gas guide member and the end of the partition, e.g. a clamp surrounding the truncated-cone portion of the gas guide member (see Figure 3) or (see paragraph [0062]) a textile press fit between the

gas guide member and the surrounding cloth of the airbag. Even in the embodiment of Figure 3 of the patent specification, formation of buckles cannot be excluded when fastening the outer fixture 26 to the plate spacer 28 by means of bolts or tightening means 46, 47, as argued by the appellant with respect to the fastening strap 21 disclosed in D2. Therefore, the board takes the view that the term "airtightly connected" according to feature **h)** cannot be understood as meaning an absolute (or 100%) airtightness, but has to be understood within the meaning of the function provided by this feature which makes it possible to control and set the pressures within the chambers at desired values (see contested patent, paragraphs [0008] and [0055]). Since D2 explicitly describes (see paragraph [0023]) such a function to inflate the chambers to different pressures, the gas guide member connected to the end of the partition by fastening a strap as known from D2 (see paragraph [0021]), which provides chambers "substantially sealed from each other" (see paragraph [0023]), is considered to represent an airtight connection as specified by feature **h)**.

According to D2, the chambers are substantially sealed from each other, and only after the airbag's deployment will gas from the chamber at higher pressure flow back through the gas-deflector into the chamber at lower pressure (see paragraph [0023]), i.e. fluid communication between the chambers is only allowed through the passage as defined by feature **k)**.

Since all the features of claim 1 are known from D2, it is concluded that the subject-matter of claim 1 as granted (Main Request) is not new with respect to document D2 (Article 54(1) EPC 1973).

3. Auxiliary Request 1 – novelty (Article 54(1) EPC 1973)

As acknowledged by the appellant, document D2 shows gas outlet apertures 18 situated opposite to the end of the partition 5. Since these outlet apertures 18 represent the gas supply portion of the inflator, the additional feature **e1)** of claim 1 according to Auxiliary Request 1 is also known from D2 and cannot establish novelty with respect to document D2 (Article 54(1) EPC 1973).

4. Auxiliary Request 2 – intermediate generalisation (Article 123(2) EPC)

Claim 1 according to Auxiliary Request 2 contains the additional feature that the amount of gas distributed to the upper chamber is different from the amount of gas distributed to the lower chamber (feature **l)**).

The respondent cited different passages forming the basis for this amendment (paragraphs [0035], [0065], [0082] in the contested patent and the A-publication, corresponding to paragraphs [0034], [0064], [0081] in the description as originally filed; in the following, the paragraph numbering in the A-publication is used). However, paragraph [0035] refers to an embodiment where the claimed result of distributing an amount of gas to the upper chamber different from the amount of gas to the lower chamber is specified in close relation to the means for achieving that distribution, i.e. the gas guide 37 formed as an inclination inclined with respect to the gas supply portion 22. This is further confirmed in paragraph [0056] relating to the same embodiment, according to which the distribution of gas to the chambers at a desired rate is adjusted e.g. by adjusting an angle of inclination of the gas guide 37.

Paragraph [0065] relates to a third embodiment according to Figures 10 to 12 and specifies a main flow downward and an auxiliary flow upward "divided vertically at a desired distribution rate". However, no indication is given, neither in paragraph [0065] nor from the symmetrical representation in Figure 12, that the two flows going upward and downward are different. A similar disclosure could be found at the beginning of paragraph [0082], as argued by the appellant. It is acknowledged that a main flow larger in flow rate than the auxiliary flow is also mentioned explicitly in paragraph [0082], but only in combination with a definition of the volume of the hip restraining chamber being smaller than the volume of the chest restraining chamber.

It is established jurisprudence of the boards of appeal that the extraction of isolated features from a set of features originally disclosed in combination for an embodiment is justified only in the absence of any clearly recognisable functional or structural relationship between said features. As argued above, added feature **1)** according to claim 1 of Auxiliary Request 2 could on the one hand be derived from an embodiment (see paragraph [0035]) which originally disclosed that different distribution rates of gas going upward and downward were realised by providing a specific shape of the gas guide ("formed as an inclination inclined with respect to the gas supply portion"), i.e. the structural characterisation of the gas guide was inextricably linked to its effect or function of distributing gas differently to the upper and lower chamber. On the other hand, feature **1)** could be derived from an embodiment which originally disclosed (see paragraph [0082]) that a larger flow rate for the main flow going downward was provided in

combination with a hip restraining chamber smaller in volume than the chest restraining chamber. Since the chamber's volume determines the flow rate necessary to achieve a desired pressure rise in the chamber, both features are closely related to each other. Due to the omission of such further structural features (form of the gas guide; volume of the chamber) disclosed originally in indispensable combination for the respective embodiments forming the basis for the amendment under consideration, the board takes the view that the amendment made to claim 1 in accordance with Auxiliary Request 2 adds new technical information and, thus, constitutes an intermediate generalisation which is not admissible under Article 123(2) EPC.

Accordingly, it is not necessary to rule on the question whether the term "amount of gas" used in feature **l)** and which is not literally disclosed in the application as originally filed unambiguously describes a "flow of gas" as originally disclosed.

5. *Auxiliary Request 3 – novelty (Article 54(1) EPC 1973)*

A side collision airbag system comprising a hip restraining chamber and a chest restraining chamber according to features **a')** and **b1)** specified in claim 1 of Auxiliary Request 3 is known from document D3 (see Figure 1). Moreover, based on an interpretation of the terms "gas introduction portion", "gas guide member" and "airtightly connected to the end of the partition", as argued previously with respect to claim 1 as granted, further features **b)** to **k)**, in particular features **c)**, **e)**, **f)**, **g)**, **h)** and **i)** are also disclosed in D3 (see Figure 2). The space accommodating the inflator in D3 between the end of partition 24 and the outer edge of the airbag, rising up to the openings 42

and 44 in the wall of housing 30 which are directly connected to the volume of the airbag chambers, represents a single gas introduction portion within the meaning of the contested patent (feature **c)**). The inflator or gas generator 36 is arranged opposite to the end of the partition 24 as required by features **d)** and **e)**. The tubular housing 30 surrounding the gas generator 36, disposed in the gas introduction portion according to the board's understanding, defines a passage for guiding the gas flowing out from the outflow openings 38 of the gas generator 36 to the inflow openings 42, 44 opening into the airbag chambers. Hence, the tubular housing 30 represents a gas guide member defining a passage as specified by features **f)**, **g)** and **i)**. Lastly, since D3 explicitly states (see column 3, line 47 to column 4, line 12) that the chambers are inflated to different pressures and that complete separation of the chambers is ensured in the inflated state, the gas guide member according to D3 must be airtightly connected to the end of the partition as required by feature **h)**, and fluid communication between the chambers is only allowed (see Figure 2) through the passage between the gas generator 36 and the tubular housing 30 as specified by feature **k)**.

With regard to feature **l')**, the board is not convinced that the terms "main flow" – relating to the amount of gas distributed to the hip restraining chamber - and "auxiliary flow" – relating to the amount of gas distributed to the chest restraining chamber - indicate a volume flow or flow rate of the main flow which is necessarily larger than the volume flow or flow rate of the auxiliary flow. In the board's view, both terms might just indicate any prioritisation of the main flow over the auxiliary flow, and without defining any

further characteristic, leaving open whether e.g. the flow rate, filling speed or pressure rise characteristic is meant. As a consequence, since in D3 the lower hip restraining chamber 22 is filled more quickly than the upper chest restraining chamber 20 (see column 5, lines 3 to 5), a "main flow" to the hip restraining chamber within the meaning of claim 1 of Auxiliary Request 3 is known from D3. Moreover, since gas is delivered from the inflator in D3 via openings 42, 44 to both chambers, it cannot be said that D3 only shows one single flow direction, as argued by the appellant.

As D3 discloses all the features of claim 1, it is concluded that the subject-matter of claim 1 according to the Auxiliary Request 3 is not new with respect to document D3 (Article 54(1) EPC 1973).

6. Auxiliary Request 4

6.1 Allowability of amendments

Claim 1 according to Auxiliary Request 4 has been amended, compared to the granted version of claim 1, by restricting the claimed subject-matter to a side collision air bag system comprising a hip restraining chamber and a chest restraining chamber, which is originally disclosed in paragraphs [0029] and [0038] of the description as filed and which has not been objected to. Furthermore, feature **1'')** has been added, specifying a main flow larger in flow rate than the auxiliary flow and a hip restraining chamber smaller in volume than the chest restraining chamber, based on paragraph [0081] of the description as originally filed.

In the board's view, claim 1 comprises the features characterising the gas distribution to the chambers according to the fourth embodiment as described in paragraph [0081] of the application as filed. In particular, it was not considered necessary to state also that the main or auxiliary flow is directly supplied to the respective chamber, which is already included in claim 1 by defining that the main flow is the "gas distributed to the hip restraining chamber" and the auxiliary flow the "gas distributed to the chest restraining chamber". Therefore, the requirements of Article 123(2) EPC are fulfilled.

6.2 *Novelty and inventive step (Article 54(1), 56 EPC 1973)*

6.2.1 Claim 1 of Auxiliary Request 4 specifies in feature **1'')** that a main flow larger in flow rate is distributed to the smaller hip restraining chamber. As described in document D3 (see column 4, line 56 to column 5, line 5), the quantity of gas flowing out into the chambers 20, 22 is determined "by the pressure in the pre-chamber 40 and the free cross-section of the respectively associated inflow openings 42, 44". Since the pressure prevailing in the space or "pre-chamber" in D3 between gas generator 36 and housing 30 is substantially equal, the quantity of gas flowing through the openings 42, 44 is mainly determined by the free cross-section of the openings 42, 44. A larger main flow to the smaller hip restraining chamber in the lower part of the side airbag according to feature **1'')** would therefore require a free cross-section of the lower inflow openings 44 in D3 to be larger than the free cross-section of the upper inflow openings 42.

However, this is neither disclosed in D3 nor obvious in view of the teaching of D3. As disclosed in D3 in

Figure 2 and the corresponding description (see also column 4, lines 34 to 37), inflow openings 44 consist of two circular passages provided in the lower part of housing 30 leading to the hip restraining chamber 22, whereas inflow openings 42 consist of three circular passages provided in the upper part leading to the chest restraining chamber 20, i.e. this teaching of D3 would rather suggest – quite the opposite to what is specified by feature **1'')** - that the main flow directed to the hip restraining chamber is smaller. Moreover, D3 does not specify any dimensional values of the total cross-section of inflow openings 42, 44 which would indicate that the flow to the hip restraining chamber – in spite of the lower number of openings 44 – is larger than the flow to the chest restraining chamber.

6.2.2 D3 also discloses (see column 4, lines 41 to 52) that the free cross-section of inflow openings 42, 44 is coordinated with the volume of the respective chambers, the pressure generated by the gas generator and the moment at which a predetermined internal pressure is to be reached. This explicitly highlights the fact that the pressure-rise characteristic of each chamber is determined not only by the pressure generated in the pre-chamber and the free cross-section of the inflow openings, but also by the volume of the respective chamber. Considering two chambers of different volume, in order to achieve at least equal pressure-rise characteristics, the larger chamber must receive a larger flow of gas compared to the smaller chamber or, conversely, a smaller flow of gas suffices to inflate the smaller chamber. However, since D3 is totally silent about the size of the hip and chest restraining chambers, it cannot be derived from D3 that a larger main flow is distributed to the hip restraining chamber. Moreover, the schematic illustration of the

airbag chambers in Figure 1 in D3 would rather suggest a smaller hip restraining chamber, as considered implicit for side airbag systems by the appellant, and therefore a smaller flow of gas necessary to provide similar inflation characteristics for both chambers.

6.2.3 It is acknowledged that D3 teaches inflation of both chambers to different internal pressures. As mentioned in D3 (see column 4, line 64 to column 5, line 2), in order "to achieve a higher internal pressure in the chamber 22 than in the chamber 20, the free cross-section of the inflow opening 44 is greater than the free cross-section which would be necessary in order to fill the chamber 22 equally quickly and with the same internal pressure as the chamber 20". However, this does not mean that the gas flow via opening 44 to chamber 22 is greater than the gas flow to chamber 20, as argued by the respondent. According to this passage in D3, the free cross-section of inflow opening 44 to the lower hip restraining chamber 22 is not compared to the free cross-section of inflow opening 42 to the upper chest restraining chamber 20, but to a fictitious value for achieving the same internal pressure. As demonstrated above, the volume of the chambers, which is not further specified in D3, is essential in this respect. When assuming, on the one hand, that the volume of the lower chamber 22 was equal to or larger than the volume of the upper chamber 20, it could be concluded from the above-mentioned passage in D3 that a larger main flow must be distributed to the lower hip restraining chamber 22 to achieve the same or even higher internal pressure in this chamber. However, this would not meet the requirement of a hip restraining chamber smaller in volume than the chest restraining chamber, as specified in feature **1'')**. On the other hand, assuming that the lower chamber 22 was smaller in

volume than the upper chamber 20 in D3, which might even be suggested by the figures in D3 as argued above, the ratio of the volume of the upper chamber to the volume of the lower chamber (V_u/V_l) was greater than unity, and in order to achieve equal pressure-rise characteristics in both chambers, the ratio of the free cross-section of lower openings to the free cross-section of upper openings (A_l/A_u) had to be chosen to be smaller than unity, corresponding to the inverse value of the ratio of volumes. In order to fill the smaller chamber more quickly, D3 teaches increasing the free cross-section of lower inflow openings 44, which means that the ratio of free cross-sections A_l/A_u would reach at least values closer to unity. However, there is no indication in D3 to select a ratio of free cross-sections A_l/A_u equal to unity or even larger, which would be necessary to provide a main flow to the hip restraining chamber larger in flow rate than the auxiliary flow to the chest restraining chamber. On the contrary, as already mentioned above, the only disclosure further found in D3 shows (see Figure 2) two circular passages to the hip restraining chamber and three circular passages to the chest restraining chamber, which results – assuming a similar size of all circular passages – in a value of 2:3 for the ratio of free cross-sections A_l/A_u.

6.2.4 Since a value of greater than unity for the ratio of free cross-sections A_l/A_u is not clearly and directly derivable from document D3, D3 does not show a main flow (to the hip restraining chamber) larger in flow rate than the auxiliary flow (to the chest restraining chamber) as required by feature **1'')**. Therefore, the subject-matter of claim 1 according to Auxiliary Request 4 is new over D3 (Article 54(1) EPC 1973).

6.2.5 Moreover, D3 does not provide any hint that – for a hip restraining chamber smaller in volume than the chest restraining chamber as claimed - the free cross-section of the inflow openings to the hip restraining chamber would be selected to have a larger value than the free cross-section of the inflow openings to the chest restraining chamber, which would suggest a main flow larger in flow rate than the auxiliary flow. D3 might mention further control means for altering the free cross-section of the inflow openings 42, 44 and thus for adjusting the gas flow to the chambers, but in the board's view there is still no motivation, neither directly given in D3 nor obvious for the skilled person, to adjust the gas flow to the chambers as claimed in feature **1'')**. Finally, the respondent has not presented any argumentation convincing the board that such modification was typical for side collision air bag systems or obvious in view of the prior art relied upon and the common general knowledge.

Therefore, the board finds that the subject-matter of claim 1 according to Auxiliary Request 4 also involves an inventive step (Article 56 EPC 1973).

6.2.6 Dependent claims 2 to 7 concern particular embodiments of claim 1 and are therefore likewise allowable.

7. Remittal to first instance (Article 111(1) EPC 1973)

The claims according to Auxiliary Request 4 are found to meet the criteria of patentability. However, the description comprises several embodiments, some of which do not fall under the scope of claim 1, and thus still requires adaption. Therefore, the board considers it appropriate to exercise its discretion under

Article 111(1) EPC 1973 and to remit the case to the department of first instance to bring the description into line with the claims. This course of action was also agreed upon by the parties during the oral proceedings before the board.

Order

For these reasons it is decided that:

1. The appealed decision is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of claims 1 to 7 of Auxiliary Request 4, submitted during oral proceedings on 31 January 2014, and a description to be amended accordingly.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated