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Datasheet for the decision of 2 June 2026

Case Number: T 0035/25 - 3.3.05

Application Number: 17773498.5

Publication Number: 3438316

IPC: C22C38/06, C22C38/58, C21D1/18, C21D9/00, C21D9/46, C23C2/06, C23C2/12

Language of the proceedings: EN

Title of invention:
STEEL SHEET FOR HOT PRESSING AND PRODUCTION METHOD THEREFOR, AND HOT PRESS MEMBER AND PRODUCTION METHOD THEREFOR

Patent Proprietor:
JFE Steel Corporation

Opponent:
ArcelorMittal S.A.

Headword:
Steel sheet/JFE

Relevant legal provisions:
EPC Art. 54, 56, 83, 87, 123(2)

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It can be changed at any time and without notice

Keyword:

Priority - (yes)
Amendments - allowable (yes)
Sufficiency of disclosure - (yes)
Novelty - main request (yes)
Inventive step - main request (yes)

Decisions cited:

Catchword:

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Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 0035/25 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 2 June 2026

Appellant: (Opponent)	ArcelorMittal S.A. 24-26, Boulevard d'Avranches 1160 Luxembourg (LU)
Representative:	Cabinet Lavoix 2, place d'Estienne d'Orves 75441 Paris Cedex 09 (FR)
Respondent: (Patent Proprietor)	JFE Steel Corporation 2-3, Uchisaiwai-cho 2-chome Chiyoda-ku Tokyo 100-0011 (JP)
Representative:	Grünecker Patent- und Rechtsanwälte PartG mbB Leopoldstraße 4 80802 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted/electronically transmitted on 3 December 2024 rejecting the opposition filed against European patent No. 3438316 pursuant to Articl e 101(2) EPC.**

Composition of the Board:

Chair	R. Winkelhofer
Members:	T. Burkhardt
	S. Besselmann

Summary of Facts and Submissions

I. The opponent's (appellant's) appeal lies from the opposition division's decision to reject the opposition against European patent No. 3 438 316 B, which concerns a steel sheet for hot pressing.

II. The numbering of the documents used in the decision under appeal also applies here:

D1	CN 101638749 A
D1a	English translation of D1
D2	EP 2 757 169 A1
D3	EP 3 181 715 A1
D5	JP 2007-314817 A
D5a	English translation of D5
D6	JP 5347393 B2
D6a	English translation of D6

III. Broken down into features, the independent claims of the main request (patent as granted) read as follows.

Claim 1:

1.1 "A steel sheet
1.2 for hot press, comprising:
a chemical composition containing, in mass%,
1.3 C: 0.180 % or more and less than 0.300 %,
1.4 Mn: 3.50 % or more and less than 11.0 %,
1.5 Si: 0.01 % to 1.5 %,
1.6 P: 0.05 % or less,
1.7 S: 0.05 % or less,

1.8 Al: 0.005 % to 0.1 %,

1.9 N: 0.01 % or less, and

1.10 C group: one or more selected from REM: 0.0005 % to 0.01 %, Ca: 0.0005 % to 0.01 %, and Mg: 0.0005 % to 0.01 %,
optionally one or more groups selected from

1.11 A group: one or more selected from Ni: 0.01 % to 5.0 %, Cu: 0.01 % to 5.0 %, Cr: 0.01 % to 5.0 %, and Mo: 0.01 % to 3.0 %,

1.12 B group: one or more selected from Ti: 0.005 % to 3.0 %, Nb: 0.005 % to 3.0 %, V: 0.005 % to 3.0 %, and W: 0.005 % to 3.0 %,

1.13 D group: Sb: 0.002 % to 0.03 %, and

1.14 E group: B: 0.0005 % to 0.05 %, and

1.15 with a balance consisting of Fe and inevitable impurities; and

1.16 a microstructure that includes ferrite and cementite and

1.17 in which Mnθ/Mnα is 1.4 or more, where
Mnα is a Mn concentration of the ferrite and
Mnθ is a Mn concentration of the cementite."

Claim 5:

5.1 "A method of manufacturing a steel sheet for hot press, comprising:

5.2 heating a slab

5.3 and hot rolling the slab to obtain a hot-rolled steel sheet, the slab having a chemical composition containing, in mass%,

5.4 C: 0.180 % or more and less than 0.300 %,

5.5 Mn: 3.50 % or more and less than 11.0 %,

5.6 Si: 0.01 % to 1.5 %,

5.7 P: 0.05 % or less,

5.8 S: 0.05 % or less,

5.9 Al: 0.005 % to 0.1 %,

5.10 N: 0.01 % or less, and

5.11 C group: one or more selected from REM: 0.0005 % to 0.01 %, Ca: 0.0005 % to 0.01 %, and Mg: 0.0005 % to 0.01 %,
optionally one or more groups selected from

5.12 A group: one or more selected from Ni: 0.01 % to 5.0 %, Cu: 0.01 % to 5.0 %, Cr: 0.01 % to 5.0 %, and Mo: 0.01 % to 3.0 %,

5.13 B group: one or more selected from Ti: 0.005 % to 3.0 %, Nb: 0.005 % to 3.0 %, V: 0.005 % to 3.0 %, and W: 0.005 % to 3.0 %,

5.14 D group: Sb: 0.002 % to 0.03 %, and

5.15 E group: B: 0.0005 % to 0.05 %, and

5.16 with a balance consisting of Fe and inevitable impurities;

5.17 cold rolling the hot-rolled steel sheet to obtain a cold-rolled steel sheet; and

5.18 performing annealing on the cold-rolled steel sheet, the annealing involving heating the cold-rolled steel sheet
to a temperature range of Ac_1 - 150 °C or more and less than Ac_1 point,

5.19 thereafter retaining the cold-rolled steel sheet in the temperature range for 1 hr or more, and

5.20 thereafter cooling the cold-rolled steel sheet."

Dependent claims 2-4 and 6-8 relate to preferred embodiments.

IV. The arguments put forward by the appellant during the appeal proceedings, where relevant to the present decision, can be summarised as follows.

The priority claims of the patent were not valid since D2 and D3 were even earlier applications in respect of the invention.

The main request did not meet the requirements of Article 123(2) EPC.

The main request did not meet the requirements of either Article 83 EPC or Article 54 EPC (over D1, D2 and D3). At any rate, it was not possible that the main request met the requirements of both articles.

Moreover, the subject-matter of claim 1 was not inventive over D1, D2, D5 and D6.

V. The patent proprietor's (respondent's) arguments at the appeal stage are reflected in the reasons below.

VI. The appellant requests that the decision be set aside and amended such that the patent be revoked.

The respondent requests that the appeal be dismissed, or that the patent be maintained as amended on the basis of one of auxiliary requests 1 to 3 submitted with the reply to the opposition.

Reasons for the Decision

Main request

1. Article 87 EPC

For the reasons set out below (see point 5.), **D2** and **D3** are not novelty-destroying and thus cannot constitute even earlier applications relating to the same invention. Thus, they do not cast doubt on the priority claims of the patent in suit being based on the respective true first applications within the meaning of Article 87(1) EPC.

The patent's priorities are thus valid.

2. Article 100(c) in combination with Article 123(2) EPC

For the reasons set out below, the main request meets the requirements of Article 123(2) EPC.

2.1 Independent claims 1 and 5 of the main request require the presence of one or more components from the "C group". The presence of one or more components from one or more of the "A group", the "B group", the "D group" and the "E group" is optional.

This amendment is based on dependent claims 2 and 7 as filed (see also paragraphs [0044] to [0049] of the application as (originally) filed), which require the presence of one or more components from at least one of groups "A group" to "E group".

The appellant was of the view that these amendments extended beyond the application as filed since there was no basis for:
(i) specifically selecting one or more components of the "C group" as being mandatory and
(ii) the optional further presence of one or more components of the other groups "A group" to "B group" and "D group" to "E group"

This is not convincing since the amendments in claims 1 and 5 correspond to the selection of one (entire) element from a list of elements (each element in turn consisting of one or more sub-elements). Namely, the element "one or more components of the C group" has been selected with all its sub-elements from the list "A group" to "E group" with their respective sub-elements (claims 2 and 7 as filed, or paragraphs [0044] to [0048] as filed).

Under these circumstances, a further pointer to the "C group" in the application as filed is not necessary.

Moreover, since claims 2 and 7 as filed (or paragraphs [0044] to [0048] as filed) indicate that the chemical composition contained "one or more [of the] groups", there is no extension beyond the original disclosure related to the optional further presence of one or more components of the other groups "A group" to "B group" and "D group" to "E group".

2.2 The appellant also objected to the addition of the term "hot pressed part" in paragraph [0001] of the patent. In their view, this extended beyond the application as filed, which only mentioned a "hot-press *forming* part" (emphasis added by the board).

However, paragraph [0001] as filed indicates that the claimed part is "obtained by hot-press forming". Moreover, paragraph [0035] as filed explains that a "hot-press forming part" is manufactured from the blank sheet and that it is ultimately used in an automotive part, thereby improving fuel efficiency.

The skilled person therefore understands that this relates to the part which has undergone the hot-pressing process.

2.3 The skilled person is therefore not presented with new information, and the requirements of Article 123(2) EPC are met.

3. Relationship between Article 83 EPC and Article 54 EPC

In this context the appellant argued that the main request did not meet the requirements of either Article 83 EPC or Article 54 EPC.

However, as will be shown below, the main request does meet the requirements of both articles.

Firstly, in the case in hand no example in the prior art is identical to an example of the claimed invention. Hence it cannot be concluded that certain properties also have to be inherently the same.

Secondly, the basis for assessing Article 83 EPC and Article 54 EPC is different. For a document to be novelty-destroying it has to directly and unambiguously disclose all the claimed features in combination. By contrast, and as explained below in more detail, for

sufficiency of disclosure the skilled person may, for example when a reproduction of an experiment fails in a first attempt, adapt the experiment by applying the teaching of the patent supplemented with their common general knowledge.

The point of contention with regard to novelty is whether a disclosure in the prior art corresponds to the general disclosure of the patent in suit in such a way that a conclusion as to certain inherent properties can be drawn. Specifically, it is in dispute whether a Mnθ/Mnα ratio in the claimed range would be inevitably obtained by a certain method in the prior art.

This question is fundamentally different from the question of whether the skilled person would be able to steer the production of the steel blank towards a Mnθ/Mnα ratio in the claimed range on the basis of the teaching of the patent in suit combined with common general knowledge.

Thus, contrary to the premise used by the appellant, the two issues – novelty and sufficiency – have to be addressed separately and individually.

4. Article 100(b) in combination with Article 83 EPC

4.1 The appellant argued that the invention could not be carried out over the entire scope of the claims. Since the definition of the microstructure in claim 1 was open, the steel could also comprise significant amounts of austenite and/or martensite. This was incompatible with the desired concentration of Mn in cementite and thus with the claimed Mnθ/Mnα ratio.

This is not convincing. Claim 1 does not *require* the presence of austenite or martensite. The patent describes the mechanism underpinning the concentration of Mn in cementite (e.g. paragraphs [0018] and [0019]), the composition and the operating steps and parameters for achieving this (in particular paragraphs [0067] to [0073], which concern the temperature and the duration of the annealing step). Moreover, the patent contains numerous examples (see the tables) that guide the skilled person seeking to obtain the claimed Mnθ/Mnα ratio. The skilled person thus has enough information to arrive at a steel sheet with the required Mnθ/Mnα ratio. A steel sheet containing such austenite or martensite fractions that the required Mnθ/Mnα ratio is not achieved does not fall under the scope of claim 1.

4.2 The appellant further submitted that either the method steps according to claim 5 inevitably resulted in the claimed microstructure, or the invention was not sufficiently disclosed.

This is not convincing either.

As indicated above, the patent contains detailed information on the underlying mechanism, instructions and numerous examples. This is significant guidance which helps the skilled person obtain a steel sheet having the desired Mnθ/Mnα ratio (which is a feature of claim 1 but not of method claim 5).

Moreover, the appellant has not provided any evidence to show that they were unable to manufacture the claimed steel sheet.

The question of sufficiency of disclosure is to be assessed with regard to the disclosure of the patent as

a whole. It is not decisive whether *every* method falling under the scope of method claim 5 necessarily results in a steel sheet in accordance with claim 1 (e.g. with the claimed Mnθ/Mnα ratio). This question can thus be left open.

The invention has been sufficiently disclosed.

5. Article 100(a) in combination with Article 54 EPC

For the reasons set out below, the subject-matter of the independent claims is novel.

5.1 **D1/D1a**

The appellant was of the view that the general disclosure of paragraph [0011] of D1/D1a anticipated the composition of claims 1 and 5 of the patent.

However, the concentration range of C (carbon) of the general disclosure of D1/D1a is broader than that of claims 1 and 5. Moreover, the concentration ranges of Si and N merely overlap with those of claims 1 and 5.

Hence, multiple selections in D1/D1a are necessary to arrive at the claimed composition. For these reasons, the Mnθ/Mnα ratio is not necessarily as claimed either.

5.2 **D2**

The appellant was furthermore of the view that the general disclosure of paragraphs [0010] to [0023] of D2 anticipated the composition of claims 1 and 5 of the patent.

However, the concentration range of C (carbon) in the general disclosure of D2 is broader, and the Si concentration range merely overlaps with those of claims 1 and 5.

Consequently, D2 does not anticipate the subject-matter of claims 1 and 5 either, for reasons similar to D1/D1a.

5.3 **D3**

Lastly, the appellant was also of the view that the general disclosure of paragraphs [0024] to [0035] of D3, which is a document as per Article 54(3) EPC, anticipated the composition of claims 1 and 5 of the patent.

However, the concentration ranges of C (carbon) and Si in the general disclosure of D3 are broader than those of claim 1 (see paragraphs [0025] and [0029] of D3).

Consequently, the general disclosure of D3 does not anticipate the subject-matter of claims 1 and 5 for reasons similar to D1/D1a or D2.

Regarding Examples AT, AW and AX of D3 (Table 1-2), the compositions are in line with claims 1 and 5. However, the Mnθ/Mnα ratio is not explicitly disclosed. With at least the annealing temperatures and annealing times being outside the ranges of claim 5 (Table 2-3), it cannot be inferred that the Mnθ/Mnα ratio is in the claimed range. In line with this, paragraph [0072] of D3 explains that Mn is to be concentrated in austenite (and in cementite as in the patent).

6. Article 100(a) in combination with Article 56 EPC

The appellant contests the inventive step of the subject-matter of claims 1 and 5 starting from:
- Example 11 of D1
- Example 38 made from steel N of D2
- D5
- D6

However, for the reasons set out below, the appellant's conclusion that the claimed subject-matter is obvious is a direct consequence of the mosaicking of features from the prior art without any incentive for solving the problem posed, and thus of hindsight considerations.

6.1 The invention relates to a steel sheet and to a method of manufacturing a steel sheet.

6.2 **Example 11 of D1/D1a** as the starting point

D1/D1a also relates to a steel sheet that is suitable for being formed at increased temperature ("thermoformed parts", end of paragraph [0008]) and used for automobiles (paragraph [0007]). D1/D1a is therefore a suitable starting point for assessing inventive step.

Example 11 of D1/D1a (Table 1) contains too much Si and no component of the C group.

According to the patent in suit, the problem to be solved is to provide a steel sheet and a method of manufacturing a steel sheet with excellent delayed fracture resistance, while maintaining high strength and uniform elongation (paragraphs [0015] and [0018]).

The patent proposes solving this problem by means of the steel sheet of claim 1 and the method of manufacturing a steel sheet of claim 5, characterised by a Si content between 0.01% and 1.5% and the presence of at least one component of the C group in the claimed ranges.

While Inventive Examples 36, 38 and 39 of the patent (made from steel sheets AE1, AG1 and AH1, respectively) have a delayed fracture resistance evaluated as "Good" (Table 6 of the patent), accompanied by favourable results for strength and elongation, Comparative Example 19 made from steel sheet L1 with too high a Si content and without a component of the C group merely shows a "Poor" performance (Tables 1 to 3). This comparison demonstrates that there is a negative effect on delayed fracture resistance when there is too much Si and no component of the C group. In view of this comparison of examples of the patent, it is of no relevance that the desired technical effect is only mentioned in paragraph [0029] and not in paragraph [0042] of the patent, with these paragraphs concerning the Si concentration and the C group, respectively.

The appellant's assertion that the poor delayed fracture resistance of Comparative Example 19 of the patent might in fact be caused by a relatively low hot-press heating temperature, which was just above the lower limit of Ac_3 disclosed on page 24 (paragraph [0083]) as filed, is merely speculative.

Furthermore, since Comparative Examples 5, 7 and 8 of the patent (made from sheets A5, B2 and B3, respectively) do not contain any component of the C

group (contrary to the requirements of claims 1 and 5), their poor fracture performance cannot prove that the problem has not been solved over the entire scope claimed (see Tables 1 and 3), contrary to the appellant's view.

Moreover, the appellant has not provided any counter-evidence that the problem has not been successfully solved.

In its general part, D1/D1a discloses an (overlapping) Si range between 0.5% and 2.3% (paragraph [0022]) and the possibility of adding a C group component (paragraphs [0028] and [0029]), but without any suggestion that this solves the technical problem posed. Paragraph [0017], invoked by the appellant for mentioning delayed fracture resistance, actually deals with S, not with Si.

Neither D5 (see paragraph [0024] of D5a) nor D6 (see paragraph [0019] of D6a) provides any such incentive either. Moreover, it is questionable whether the skilled person starting from the high-Mn steel 11 of D1 would even contemplate the teaching of D5 and D6, which disclose lower Mn concentrations.

6.3 **Example 38 of D2** as the starting point

D2 relates to a steel sheet which has high strength and excellent formability and which is used for automobiles (paragraph [0001]). It is therefore a suitable starting point for assessing inventive step.

The C (carbon) content of steel N (which is used in Example 38) is too low (Table 1). Moreover, the

annealing temperature is above the range of claim 5 (Table 2). Consequently, the Mnθ/Mnα ratio of the steel sheet is not necessarily as claimed either.

According to the patent in suit, the problem to be solved is to provide a steel sheet with excellent delayed fracture resistance, while maintaining high strength and uniform elongation (paragraphs [0015] and [0018]).

Paragraphs [0018], [0054] and [0067] to [0070] of the patent explain the mechanism underpinning the invention in detail, in particular the obtained strength, elongation and delayed fracture resistance that result from the amount and size of the retained austenite. The latter, in turn, depends on the Mnθ/Mnα ratio and the annealing conditions. Paragraph [0027] of the patent explains the role of C (carbon) for obtaining sufficient strength and elongation.

Inventive Examples **36**, **38 and 39** of the patent (based on sheets AE1, AG1 and AH1, respectively) have the desired properties (see Table 6).

In contrast, Comparative Example 12 of the patent (based on steel sheet E1, the C (carbon) content of which is too low) results in low tensile strength (Tables 1 and 3). Comparative Examples 2, 3 and 9 (based on steel sheets A2, A3 and B4, respectively) have too low an Mnθ/Mnα ratio, resulting in poor delayed fracture resistance (Tables 2 and 3). The low ratio might be due to annealing temperatures and/or durations outside the claimed ranges, as explained in paragraphs [0067] to [0071] of the patent.

It is true that, compared with Example 38 of D2, Comparative Examples E1, A2, A3 and B4 of the patent additionally have the presence of the C group component(s) as a distinguishing feature. Consequently, these comparative examples of the patent are not entirely representative of Example 38 of D2, which comprises components of the C group as claimed. However, the appellant has not provided any experiments of its own to show that the claimed subject-matter does not achieve the desired effects over Example 38 of D2.

Since Comparative Examples 4, 5 and 8 of the patent (based on sheets A4, A5 and B3, respectively) do not contain component(s) of the C group (in contrast to the requirements of claims 1 and 5), their poor tensile strength, uniform elongation and/or delayed fracture resistance (Table 3) cannot prove that the problem has not been solved over the entire scope claimed.

Under these circumstances, there is no doubt that the problem has been successfully solved.

In the absence of an incentive in the available prior art (in particular in D1, D5 and D6) to solve the technical problem posed by the distinguishing features, an inventive step is to be acknowledged. D2 actually teaches away from the claimed solution since Mn is to be concentrated in austenite, not in cementite as claimed (paragraph [0052] of D2).

6.4 **D5/D5a** and **D6/D6a**

The board concurs with the opposition division that D5/D5a and D6/D6a are more remote from the invention than Example 11 of D1 and Example 38 of D2.

- **D5/D5a** requires several selections from the concentration ranges of the general disclosure to arrive at the claimed composition. In particular, Mn is central to the invention (see paragraph [0019] of the patent), but there is only a one-point overlap for Mn in the general disclosure of D5/D5a (paragraph [0011]). All the examples of D5 have an Mn content significantly below the claimed range (Table 1). Moreover, there is merely an overlap in the annealing temperature range generally disclosed in D5/D5a with that claimed, and the annealing retention time is lower than that claimed (paragraph [0054]). As explained in paragraphs [0070] to [0071] of the patent, the annealing conditions are also central to Mn diffusion. Moreover, D5/D5a does not disclose the claimed Mnθ/Mnα ratio, and because of the above-mentioned differences, an Mnθ/Mnα ratio in the claimed range is not implicitly disclosed either.

- **D6/D6a** similarly requires several selections from the concentration ranges of the general disclosure to arrive at the claimed composition. In particular, there is only a small overlap for Mn in the general disclosure of D6/D6a (paragraph [0020]). All the examples of D6 have an Mn content significantly below the claimed range (Table 1). The annealing temperature may also be slightly higher than Ac_1 (paragraph [0042], margin ref. 436 in D6a), and the annealing time is not mentioned in D6/D6a. Moreover, D6/D6a does not disclose the claimed Mnθ/Mnα ratio, and because of the above-mentioned differences, an Mnθ/Mnα ratio in the claimed range is not implicitly disclosed either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

C. Vodz R. Winkelhofer

Decision electronically authenticated