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Datasheet for the decision of 11 April 2025

Case Number: T 0030/24 - 3.3.05

Application Number: 17879107.5

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Language of the proceedings: EN

Title of invention:
HIGH MN STEEL SHEET AND METHOD FOR PRODUCING SAME

Patent Proprietor:
JFE Steel Corporation

Opponent:
ArcelorMittal

Headword:
HIGH MN STEEL SHEET/JFE Steel Corp.

Relevant legal provisions:
EPC Art. 54, 56
RPBA 2020 Art. 13(2), 12(3)

Keyword:
Novelty - (yes)
Inventive step - (yes)
Statement of grounds of appeal - reasons set out clearly and concisely (yes)
Amendment after summons - exceptional circumstances (no) - taken into account (no)

Decisions cited:
T 0653/93, T 1095/18, T 0065/96

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 0030/24 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 11 April 2025

Appellant: (Opponent)	ArcelorMittal 24-26, Boulevard d'Avranches 1160 Luxembourg (LU)
Representative:	Lavoix 2, place d'Estienne d'Orves 75441 Paris Cedex 09 (FR)
Respondent: (Patent Proprietor)	JFE Steel Corporation 2-3, Uchisaiwaicho 2-chome Chiyoda-ku Tokyo 100-0011 (JP)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 26 October 2023 rejecting the opposition filed against European patent No. 3553195 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	J. Roider
	O. Loizou

Summary of Facts and Submissions

I. The opponent's (appellant's) appeal lies from the opposition division's decision to reject the opposition.

II. The following documents are relevant here:

D1	JP 2016-84529 A
D1a/D1b	machine translations of D1
D1c	new machine translation of D1, filed during the oral proceedings before the board

III. Claim 1 of the main request (claims as granted, sole claim request) reads as follows:

"1. A high-Mn steel plate having a component composition containing, in mass%,
C: 0.20 to 0.70%,
Si: 0.05 to 1.0%,
Mn: 15 to 30%,
P: 0.028% or less,
S: 0.02% or less,
Al: 0.01 to 0.1 %,
Cr: 0.5 to 7.0%,
Ni: 0.03 to 0.30%,
N: 0.0010 to 0.0200%, and
one or two or more of
Nb: 0.003 to 0.030%,
V: 0.03 to 0.10%,
Ti: 0.003 to 0.040%, and
optionally an element in at least one group selected from the following group A or B:

Group A: one or two, in mass%, selected from
Mo: 0.05 to 2.0% and
W: 0.05 to 2.0%
Group B: one or two or more, in mass%, selected from

Ca: 0.0005 to 0.0050%,
Mg: 0.0005 to 0.0050%, and
REM: 0.0010 to 0.0200%
with the balance being Fe and incidental impurities, wherein:
a microstructure 0.5 mm under a surface of the steel plate includes austenite as a base phase; and 25% or more of the austenite, in area ratio, has an equivalent circle diameter of 10 μm or more and an aspect ratio of a major axis to a minor axis of 3 or more."

Dependent claims 2 and 3 concern particular embodiments of product claim 1.

Independent method claim 4 refers to claim 1 and therefore contains all of its features.

IV. The appellant (opponent) argued that claims 1 and 4 of the patent in suit lacked novelty over D1 and did not involve an inventive step starting from Example 21 of D1, and also starting from an embodiment defined by claims 1 and 2 of D1, combined with the preferred ranges in D1.

V. The respondent (patent proprietor) argued that the appeal was not substantiated, the patent in suit was novel over D1, the attack under Article 56 EPC was not to be admitted, and the patent in suit involved an inventive step.

VI. Substantive requests:

(a) The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

(b) The respondent (patent proprietor) requested that the appeal be dismissed.

Reasons for the Decision

1. Admissibility of the appeal, Article 12(3) RPBA

The respondent considered that the appeal was not sufficiently substantiated because the reasons for the decision were allegedly not sufficiently addressed.

In the board's view the appellant repeatedly referred to the reasoning of the appealed decision ("... the opposition division considers ..." or similar expressions; see for instance points 3.1.1., 3.1.2., 4.1.1. and 4.1.2. of the statement of grounds of appeal) and then explained why it disagreed with that view.

Therefore, the requirements of Article 12(3) RPBA are considered to be met. The appeal is admissible.

2. Claim 1, novelty, Article 54(1) and (2) EPC

2.1 The appellant argued that claims 1 and 2 of D1 anticipated the novelty of claim 1 of the patent in suit.

Claims 1 and 2 both set out several ranges which partially overlap with the claimed ranges, as summarised in Table 1 of the statement of grounds of appeal (statement of grounds of appeal, pages 1 and 2).

In addition, the appellant demonstrated in paragraph 3.1.2 of the statement of grounds of appeal that the temperature ranges according to claim 4 partially overlap with the temperature ranges disclosed in paragraphs [0041] (heating), [0043] (hot rolling) and [0044] (cooling) of D1.

In view of this disclosure, the appellant argued that the skilled person would have seriously contemplated working within the claimed ranges of the steel composition.

2.1.1 It is established case law that the question of disclosure of a composition cannot be assessed by contemplating the ranges of the various elements individually, since the subject-matter of claim 1 is constituted by the combination of the ranges of the composition (see Case Law Book 10th edition, I.C.6.3.3, particularly T 653/93, point 3.2.1 of the Reasons, T 1095/18, point 1.4 of the Reasons and T 65/96, point 5.3.1 of the Reasons).

The appellant argued that the skilled person would have seriously contemplated working within the claimed combination of ranges because the steel composition in claims 1 and 2 of D1 was not far removed from these ranges. Moreover, the claimed ranges were not narrow compared with the ranges disclosed in D1.

The appellant thus referred to the criteria for the selection from a broad range according to the Case Law of the Boards of Appeal, 10th edition 2022, I.C.6.3.1; however, these criteria relate to the selection from a single broad range. The argument therefore fails in the present case.

Therefore, neither claim 1 nor claim 2 explicitly or implicitly discloses the composition of the product according to claim 1.

2.2 The appellant further argued that the preferred ranges in D1 anticipated the novelty of claim 1 of the patent in suit.

Table 1 of the statement of grounds of appeal shows that a number of preferred ranges partially overlap with the respective claimed ranges, in particular the content of N and Ni.

2.2.1 As a result, the considerations set out in point 2.1.1 above regarding the multiple selection of ranges apply.

The attack fails for this reason alone.

2.3 The appellant also argued that Example 21 of D1 anticipated the novelty of claim 1 of the patent in suit.

Table 1 of the statement of grounds of appeal shows that Example 21 of D1 differs from the claimed subject-matter at least on account of the P, N, Mo and Cu content.

2.3.1 With respect to the appellant's arguments that the skilled person would have seriously contemplated

changing the composition so as to work within the claimed range, reference is made to point 2.1.1 above.

2.4 The subject-matter of claim 1 therefore is novel over D1. Nothing else applies to claim 4 because it contains the composition of the product according to claim 1.

3. Admissibility of the objection of lack of inventive step in the opposition proceedings

The respondent objected to the admission of the opponent's late inventive-step objection in the first-instance proceedings; however, it is established case law that, in opposition proceedings, additional grounds may be considered by the opposition division which *prima facie* seem to prejudice the maintenance of the European patent.

The board therefore considers the opposition division's decision correct in this respect.

4. Claim 1, inventive step, Article 56 EPC

The invention relates to a high-Mn steel plate suitable for structural steel in a cryogenic environment (patent in suit, paragraph [0001]).

D1 is a suitable starting point for an inventive-step objection because it also discloses a high-Mn steel for a cryogenic environment, which is not disputed.

The appellant develops two attacks starting from D1.

4.1 As a first attack, the appellant proposes starting from an embodiment established by claims 1 and 2 combined with the preferred ranges in D1.

When analysing the preferred ranges disclosed in the description, it is immediately apparent that there are a number of ranges that partially overlap with the claimed ranges. These are at least those of the composition (values in bold indicate an end value that falls outside the claimed range):

	patent in suit		D1, claims 1 and 2		preferred in D1		paragraph
Element	min	max	min	max	min	max	in D1
Ni	0.03	0.3	0.1	**7.0**	0.1	**2**	[0021]
N	0.001	0.02	0.005	**0.05**	0.005	**0.03**	[0025]
Nb	0.003	0.03	**--**	**0.5**	0.005	**0.2**	[0031]
V	0.03	0.1	**--**	**0.5**	**0.01**	**0.2**	[0032]
Ti	0.003	0.04	**--**	**0.5**	0.005	**0.3**	[0033]
Mo	0.05	2	**--**	**3.0**	**0.01**	0.7	[0030]
Ca	0.0005	0.005	**--**	**0.01**	**--**	**0.0003**	[0035]
Mg	0.0005	0.005	**--**	**0.01**	**0.0002**	0.003	[0036]
REM	0.001	0.02	**--**	**0.05**	**--**	0.003	[0037]
Cu	--	--	--	**3.0**	**0.01**	**0.7**	[0029]
B	--	--	--	**0.001**	**0.0005**	**0.001**	[0034]

Of these elements, the appellant has only identified a difference for Ni, N, Nb, V and Ti in its inventive-step objection; however, an alloy according to all the preferred ranges in D1 contains further elements, such as Mo and Mg, which may be present outside the claimed ranges. In addition, according to D1, the preferred range of Cu is beyond what could be considered an

impurity, but must not be present in the claimed alloy.

The appellant therefore starts its analysis from an embodiment that is not disclosed in D1.

Document D1c, another machine translation of D1, was filed during the oral proceedings before the board. Irrespective of the question of the admission of D1c under Article 13(2) RPBA, it does not change the above finding. The ranges disclosed in claims 1 and 2 of D1c are also represented in the above table. They are consistently broader than the preferred ranges, such that only a multiple selection would yield the starting point assumed by the appellant.

When claims 1 and 2 are considered in combination with the preferred ranges in D1, it is clear that the assumed starting point can only be achieved by a purposeful selection from them.

A starting point for an inventive-step objection must be directly and unambiguously disclosed in D1. This is not the case for the combination of claims 1 and 2 with the preferred ranges disclosed in the description.

An inventive-step objection based on the starting point assumed by the appellant has to fail for this reason alone.

4.2 Alternatively, the appellant proposes starting from Example 21 of D1.

4.2.1 The problem that the patent aims to solve is, according to paragraph [0009], to provide a high-Mn steel plate having excellent resistance to stress corrosion

cracking and cryogenic toughness.

4.2.2 It is proposed that the problem be solved by the features of claim 1, which differ from Example 21 of D1 at least on account of the P and N content, but also on account of the Cu content, which is not present in the claimed alloy, and the Mo content, which is not present in a sufficient quantity in Example 21 of D1.

Whether the microstructure constitutes a further difference does not need to be discussed, since the claimed composition is not obvious to the skilled person anyway.

4.2.3 Success of the solution

The table below summarises the differences of the four elements:

	patent in suit		D1, Example 21
Element	min	max	
P	--	0.028	0.030
N	0.001	0.02	0.033
Cu	--	--	0.11
Mo	0.05	2	0.01

The patent in suit discloses that **P** above 0.028% degrades the resistance to stress corrosion cracking (patent in suit, paragraph [0018]).
D1 discloses that P above 0.04% degrades the hot workability and the toughness. Although the lower the P content the better, from a production cost point of view, P can be 0.03% or more (D1: paragraph [0024]).

The patent in suit discloses that **N** suppresses stress corrosion in the presence of one of Nb, V or Ti, which is effective for an N content of at least 0.001%; however, an N content in excess of 0.02% impairs the toughness (patent in suit, paragraph [0023]).
D1 discloses that at cryogenic temperatures, the addition of N for improving strength is more effective than the addition of C, without the adverse effect on toughness. In excess of 0.05%, the toughness is significantly degraded such that N should preferably be kept below 0.03% (D1: paragraph [0025]).

The patent in suit discloses that **Mo** increases the strength of the base metal but adversely affects the toughness (patent in suit: paragraphs [0032]).
D1 also discloses that Mo increases the strength but reduces the toughness (D1: paragraph [0030]).

The patent in suit does not foresee **Cu** as being contained in the alloy. D1 discloses that Cu increases the strength and should be above 0.01% for that purpose (D1: paragraph [0029]).

Like the patent in suit, D1 also aims to provide a steel with **high cryogenic toughness**.
From the teaching of the patent in suit and D1, the differences in N, Cu and Mo content have an effect on the strength and/or the toughness.
The differences are such that they have an opposite effect on the cryogenic toughness, and so the overall effect of these differences is not clear.

D1 does not disclose anything about the **resistance to stress corrosion cracking**. As far as the different elements are concerned, only the difference in P

content affects the resistance to stress corrosion cracking; however, the P content in Example 21 of D1 is only 0.002% above the upper limit of the claimed range and there are a number of other elements, such as Cr, which, according to the patent in suit, have a significant effect on the resistance to stress corrosion cracking (patent in suit, paragraph [0021]). The claimed Cr content can be as low as 0.5% and Example 21 of D1 has a Cr content of 3.76%; however, it is speculative to assume that the higher Cr content in Example 21 of D1 can mitigate the negative effect of the higher P content.

Therefore, while it cannot be inferred from the patent in suit that the claimed alloy provides an improvement in the resistance to stress corrosion cracking and cryogenic toughness over Example 21 of D1 over the entire claimed range, it cannot be denied at the outset.

The claims of the main request are the claims of the granted patent. It is therefore incumbent on the opponent to provide facts, arguments and evidence to support the assertion of lack of inventive step. This is not the case here.

When the essential facts cannot be proven, a decision must be made on the basis of the answer to the question of who bears the burden of proof. This also applies when the parties make contradictory but unsubstantiated assertions concerning facts relevant to establishing patentability and the EPO is not in a position to establish the facts of its own motion.
This is to the detriment of the party bearing the burden of proof.

Therefore, the technical problem under consideration cannot be reformulated into a different technical problem, such as that suggested by the appellant (statement of grounds of appeal, page 10, fifth or last paragraph). The starting point is therefore the technical problem as stated by the respondent (see patent in suit, paragraph [0009]).

4.2.4 When faced with the above technical problem, the skilled person would not arrive at the claimed subject-matter by starting from Example 21 of D1, since they would at least have to suitably modify the content of four elements in the alloy in order to arrive at the claimed subject-matter, but D1 provides no incentive to do so.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated