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Datasheet for the decision
of 11 December 2013

Case Number:	T 2059/10 - 3.2.05
Application Number:	04710000.3
Publication Number:	1599689
IPC:	F16L15/06
Language of the proceedings:	EN

Title of invention:
A threaded joint for tubes

Patent Proprietor:
Tenaris Connections Ltd.

Opponent:
Vallourec Oil & Gas France

Relevant legal provisions:
RPBA Art. 13(1)
EPC 1973 Art. 100(b)

Keyword:
Late-filed requests - justification for late filing (no)
Sufficiency of disclosure (no)

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Case Number: **T 2059/10 - 3.2.05**

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 11 December 2013

Appellant: (Patent Proprietor)	Tenaris Connections Ltd. 112 Bonadie Street Kingstown (VC)
Representative:	Bruno Cinquantini Notarbartolo & Gervasi S.p.A. Corso di Porta Vittoria, 9 20122 Milano (IT)
Respondent: (Opponent)	Vallourec Oil & Gas France 54 rue Anatole France 59620 Aulnoye-Aymeries (FR)
Representative:	Jean Yves Plaçais Cabinet Netter 36, avenue Hoche 75008 Paris (FR)
Decision under appeal:	Decision of the Opposition Division of the European Patent Office posted on 5 August 2010 revoking European patent No. 1599689 pursuant to Article 101(3)(b) EPC.

Composition of the Board:

Chairman:	M. Poock
Members:	S. Bridge
	G. Weiss

Summary of Facts and Submissions

I.   An appeal was lodged against the decision of the
        opposition division revoking the European patent
        No. 1 599 689.

        The opposition was filed against the patent as a whole
        based on Article 100(a) EPC 1973 (non patentable
        subject-matter under Article 52(2)(a) EPC 1973, lack of
        novelty, Article 54 EPC 1973, and lack of inventive
        step, Article 56 EPC 1973) and Article 100(b) EPC 1973
        (the invention is not disclosed in a manner
        sufficiently clear and complete for it to be carried
        out by a person skilled in the art).

        The opposition division held that the invention is not
        disclosed in a manner sufficiently clear and complete
        for it to be carried out by a person skilled in the
        art.

II.   Oral proceedings were held before the board of appeal
        on 11 December 2013.

        The appellant (patent proprietor) requested that the
        decision under appeal be set aside and the patent be
        maintained in amended form on the basis of the claims
        submitted at the oral proceedings on 11 December 2013
        as main request, first, second and third auxiliary
        requests or on the basis of the claims filed with
        letter dated 8 November 2013 as main request and first,
        second and third auxiliary requests now renumbered as
        fourth to seventh auxiliary requests.

        The respondent (opponent) requested that the appeal be
        dismissed.

III.   Claim 1 according to the main request reads as follows:

"1. A threaded joint for pipes, comprising a pin (1,1', 1") and a box (2,2',2"), each having, at at least one end, a respective threaded portion, the joint being provided with two most distant seals, in which said respective threaded portions are coated with a layer of dry lubricant having a thickness of between 5 μm and 30 μm and in which a nominal void volume (NVV) of the space (6,7) between pin member and box member is sized so that the following formula is satisfied:

$$NVV[cm^3] \leq 4 \times OD[inch]$$

where OD is the nominal outer diameter of said pipes, and wherein NVV is calculated by evaluating the empty spaces between the two most distant seals."

IV.   Claim 1 according to the first auxiliary request differs from claim 1 according to the main request in that, the feature:

"*so that the following formula is satisfied:*

$$NVV[cm^3] \leq 4 \times OD[inch]$$

where OD is the nominal outer diameter of said pipes"

reads instead:

"*so that the following formulas are satisfied:*

$$NVV[cm^3] \leq 4 \times OD[ins]$$

and

$$\frac{NVV\left[cm^3\right]}{OD[ins] \times \sqrt{Wt[mm]}} \leq 1$$

where OD is the nominal outer diameter of said pipes and Wt is the thickness of the wall of said tubes".

V.   Claim 1 according to the second auxiliary request
        differs from claim 1 according to the first auxiliary
        request in that, the feature
        "*the joint being provided with two most distant seals*"
        is replaced by the feature
        "*the joint being provided with two most distant seal
        elements*"
        and the following additional feature is introduced at
        the end of the claim: "*wherein the area g_T of the free
        space (5, 6) between the threads engaged in the section
        of the joint considered on an axial plane is less than
        $0,4mm^2/pitch$*.".

VI.   Claim 1 according to the third auxiliary request
        differs from claim 1 according to the second auxiliary
        request in that, the following additional feature is
        inserted after "*the joint being provided with two most
        distant seals,*": "*wherein the pin has two outer
        threaded portions (12, 13) with frusto-conical shape,
        which are axially staggered and separated by a shoulder
        (9'), and the box has two inner threaded portions (10,
        11) having a frusto-conical shape, which are axially
        staggered and separated by a shoulder (9"), which acts
        as a detent during screwing,*".

VII.   Claim 1 according to the fourth auxiliary request reads
        as follows:

        "1. A threaded joint for pipes, comprising a pin (1,1',
        1") and a box (2,2',2"), each having, at at least one
        end, a respective threaded portion, the joint being
        provided with two seal elements, in which said
        respective threaded portions are coated with a layer of
        dry lubricant having a thickness of between 5 µm and
        30 µm and in which a nominal void volume (NVV) of the

space (6,7) between pin member and box member is sized
so that the following formula is satisfied:

$$NVV[cm^3] \leq 4 \times OD[inch]$$

where OD is the nominal outer diameter of said pipes."

VIII.   Claim 1 according to the fifth auxiliary request
        differs from claim 1 according to the fourth auxiliary
        request in that, the end of the claim

        "*so that the following formula is satisfied:*

        $$NVV[cm^3] \leq 4 \times OD[inch]$$

        where OD is the nominal outer diameter of said pipes."

        reads instead:

        "*so that the following formulas are satisfied:*

        $$NVV[cm^3] \leq 4 \times OD[ins]$$

        and

        $$\frac{NVV\left[cm^3\right]}{OD[ins] \times \sqrt{Wt[mm]}} \leq 1$$

        *where OD is the nominal outer diameter of said pipes
        and Wt is the thickness of the wall of said tubes.*"

IX.   Claim 1 according to the sixth auxiliary request
        differs from claim 1 according to the fifth auxiliary
        request in that, the following additional feature is
        introduced at the end of the claim: "*wherein the area g_T
        of the free space (5,6) between the threads engaged in
        the section of the joint considered on an axial plane
        is less than 0,4 mm^2/pitch.*".

X.   Claim 1 according to the seventh auxiliary request
        differs from claim 1 according to the sixth auxiliary
        request in that, the following additional feature is
        inserted after "*the joint being provided with two seal*

elements,": "wherein the pin has two outer threaded portions (12, 13) with frusto-conical shape, which are axially staggered and separated by a shoulder (9'), and the box has two inner threaded portions (10, 11) having a frusto-conical shape, which are axially staggered and separated by a shoulder (9"), which acts as a detent during screwing,".

XI.   The following documents are referred to in the present decision:

D07: "*Specification for Threading, Gauging, and Thread Inspection of Casing, Tubing, and Line Pipe Threads (U.S. Customary Units)*", API Specification Standard 5B, fourteenth edition, August 1996, pages 1 to 11.

XII.   The arguments of the appellant in the written and oral proceedings can be summarised as follows:

Although a main request and a 1st, 2nd and 3rd auxiliary request (now renumbered as fourth to seventh auxiliary request) were already filed on 8 November 2013 in response to the annex to the summons to oral proceedings before the board, the practical difficulties in liaising with remote technical experts and inventors meant that the new main request and 1st, 2nd, and 3rd auxiliary requests now filed during oral proceedings on 11 December 2013 could not be provided any earlier. The respective claims 1 of these requests have been further limited by the introduction of features concerning two most distant seals. This change was made in response to an issue raised in the annex to the summons to oral proceedings before the board and is such that it can easily be dealt with by the respondent and the board. For these reasons, the new main request and 1st, 2nd, and 3rd auxiliary requests filed during oral procee-

dings on 11 December 2013 should be admitted into the proceedings.

Although the scope of claim 1 is not limited to the natural-gas and oil extraction industry, the relevant skilled person is from that industry. This skilled person understands that NVV should be understood as the actual amount of empty space present within the joint. The language in the description concerning NVV being an "*index*" (paragraph [0037]) is merely a poor translation from the Italian. Instead NVV should be understood as providing an "*indication*" of the amount of empty space present within the joint. The skilled person knows how to calculate the amount of empty space present within the joint, for example, using a computer aided design (CAD) system. The calculations and equations set out in paragraph [0039] merely explain the approximate, possibly wrong, calculations made by the inventor in arriving at the equation of claim 1. Alternatively, the calculations and equations set out in paragraph [0039] provide at least one manner of calculating NVV - a skilled person from the natural-gas and oil extraction industry knows how to perform these calculations and what is meant by the perfect thread length (PTL), the imperfect thread length (ITL) and nominal configuration of the joint which are, for example, disclosed in catalogues where the joint is shown under load. The invention is thus disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person from the natural-gas and oil extraction industry.

XIII.   The arguments of the respondent in the written and oral
        proceedings can be summarised as follows:

        The changes made to the respective claims 1 of the new
        main request and 1st, 2nd, and 3rd auxiliary requests
        filed during oral proceedings on 11 December 2013 do
        not address all the insufficiency of disclosure issues
        raised in the annex to the summons to oral proceedings
        before the board. Furthermore, the changes made
        introduce new problems with respect to Article 123(2)
        EPC, for example, with respect to the newly introduced
        feature of "*two most distant seals*". The explanation of
        the appellant concerning difficulties in liaising with
        remote technical experts or inventors is not sufficient
        to justify surprising the respondent with these late
        filed requests, in particular as the appellant had
        already filed a main request and 1st, 2nd and 3rd
        auxiliary request (now renumbered as fourth to seventh
        auxiliary request) on 8 November 2013 in response to
        the annex to the summons to oral proceedings before the
        board. For these reasons the main request and 1st, 2nd,
        and 3rd auxiliary requests filed during oral procee-
        dings on 11 December 2013 should not be admitted into
        the proceedings.

        The parameter NVV (nominal void volume) is not usual in
        the technical area of threaded joints. The appellant's
        position that NVV should be understood as the actual
        amount of empty space present within the joint is
        contradicted by the description which explicitly states
        that the nominal empty volume is "*an index*" thereof
        (paragraph [0037]) and that NVV "*must be*" calculated
        using the equations set out in paragraph [0039]. These
        equations do not calculate the actual amount of empty
        space present within the joint. Furthermore, the only
        manner of calculating NVV (as defined in paragraph

[0039] of the patent in suit) involves ill defined
quantities (g_T, PTL, ITL, k, G_C) which require the
skilled person to make arbitrary choices so that no
consistent result can be obtained. Illustrations in
catalogues are not always complete and the *nominal
configuration* is a matter of definition, but none is
supplied in the patent in suit. The patent in suit also
fails to specify the kind of dry lubricant to be
considered - however, this has implications for the
amount of space it will need to occupy in the joint.
Similarly, it is not clear whether NVV is to be
calculated before or after the dry lubricant is
applied. The latter issue is essential for determining
g_T and G_C. It is thus not possible for the skilled
person to determine with certainty what to calculate
for *NVV* or whether he is working in the prohibited area
of the claims. In consequence, the invention is not
disclosed in a manner sufficiently clear and complete
to enable it to be carried out by a skilled person.

Reasons for the Decision

1.   Admissibility of the main request and 1st, 2nd, and 3rd
auxiliary requests filed during oral proceedings on
11 December 2013

The respective claims 1 of these requests have been
further limited by the introduction of features concer-
ning two most distant seals. Although this change
addresses one of the issues raised in the annex to the
summons to oral proceedings before the board, none of
the other issues (such as the nature of the "*nominal
configuration*"; whether the volume occupied by the dry
lubricant is included or excluded from the calculation
of "*NVV*"; the definition or calculation of the parame-

ters "*perfect-thread length PTL*", "*imperfect-thread length ITL*", "*k*" and "g_T" raised in point 8 of the annex to the summons to oral proceedings) were addressed and thus cannot be *prima facie* overcome. In addition, as pointed out by the respondent, these requests would need further discussions with respect to Article 123(2) EPC, for example, with respect to the feature that it is the "*joint*" which is provided with "*two most distant seals*" (main request and 1st auxiliary request), respectively, "*seal elements*" (2nd and 3rd auxiliary request).

The explanation of the appellant concerning difficulties in liaising with remote technical experts or inventors is not sufficient to permit such late filing of these requests, in particular as the appellant had already filed a main request and 1st, 2nd and 3rd auxiliary request (now renumbered as fourth to seventh auxiliary request) in response to the annex to the summons to oral proceedings before the board on 8 November 2013.

For these reasons the main request and 1st, 2nd, and 3rd auxiliary requests filed during oral proceedings on 11 December 2013 are not admitted into the proceedings.

2.   Sufficiency of disclosure - Article 83 EPC 1973

2.1   Claim 1, respectively according to the fourth to seventh auxiliary request, refers to a quantity *NVV* "*of the space (6,7) between pin member and box member*" called "*nominal void volume (NVV)*". As pointed out by the respondent and not contested by the appellant, the term "*nominal void volume*" is not generally known in the art of threaded pin and box joints and is not further defined in claim 1.

2.2   Meaning of NVV

It was argued on behalf of the appellant that the
skilled person would nevertheless understand NVV to be
the actual amount of empty space present in the joint
between pin member and box member. However, the board
cannot follow this argument, because it is not
supported by the language of the description and
claims. The language of claim 1 (respectively according
to the fourth to seventh auxiliary request) "*in which a
nominal void volume (NVV) of the space (6,7) between
pin member and box member is sized so that …*" clearly
places the emphasis on the "*nominal void volume NVV*"
and not on the "*the space (6,7) between pin member and
box member*" so that, although NVV is somehow related to
this space, it is not necessarily identical to it.

According to the description of the patent in suit, *NVV*
is also called "*nominal empty volume*" and is first
mentioned in paragraph [0036] in connection with the
formula $NVV[cm^3] \leq 4 \times OD[inch]$ which also appears in
the claim. It is thus reasonable for the skilled person
to conclude that the terms "*nominal empty volume*",
"*nominal void volume*" and *NVV* are synonyms.

Paragraph [0037] defines the "*nominal empty volume*" as
"*an index of the amount of empty space present within
the joint*". This definition implies that *NVV* need not
necessarily correspond to the actual "*space (6,7)
between pin member and box member*" but only has to be
an "*index of the amount of empty space present within
the joint*" (underlining added by the board).

It was argued on behalf of the appellant that the
language in the description concerning NVV being an

"*index*" (paragraph [0037]) is merely a poor translation
from the Italian and that instead NVV is to be
understood as providing an "*indication*" of the amount
of empty space present within the joint. However, even
assuming this argument to be correct, this does not
change the situation, because again such an
"*indication*" need not necessarily be identical to the
actual amount of empty space present in the joint.

According to paragraph [0039] of description of the
patent in suit the "*nominal empty volume NVV is*"

$$NVV = \pi\left(G_T\left[mm^2\right] + G_C\left[mm^2\right]\right) \times OD[in] \times 25.4\left[\frac{mm}{in}\right]$$

where
G_T is the "*total empty area in the thread [mm^2]*",
G_C are "*other empty spaces*", and
OD is the outside diameter of the pipe.

This equation confirms that *NVV* is not the amount of
empty space present in the joint between pin member and
box member, because the sum of the areas of the empty
spaces (G_T + G_C "*considered on an axial plane*") is
simply multiplied by "*πOD*", i.e. the circumference of
the *outer diameter OD* of the pipe. Thus, the right hand
side of the above equation only corresponds to the
volume of a hypothetical torus of mean diameter OD and
cross sectional area (G_T + G_C). By contrast, the
calculation of the actual volume would instead require
multiplication by the true length along one pitch of
the thread at the respective centroids of the areas G_T
and G_C, i.e. not at the outside diameter of the pipe.

Thus, the disclosure of the patent in suit indicates
that the quantity *NVV* is not "*the amount of empty space*

present within the joint" but merely an arbitrary
quantity to be calculated by means of the equation

$$NVV = \pi\left(G_T\left[mm^2\right] + G_C\left[mm^2\right]\right) \times OD[in] \times 25.4\left[\frac{mm}{in}\right]$$

given in paragraph [0039], or in the language of the
patent, corresponds to an "*index*".

2.3   Skilled person

Claim 1, respectively according to the fourth to
seventh auxiliary request, concerns a threaded joint
for pipes and is not limited to a particular field of
industry. During the oral proceedings, the appellant
confirmed that this was also his understanding of the
subject-matter of claim 1.

The board thus cannot accept that the skilled person
for this invention should be from the natural-gas and
oil extraction industry as asserted by the appellant
without the provision of any supporting argumentation.
Paragraph [0001] of the patent in suit merely presents
the natural-gas and oil extraction industry as an
example.

Thus, the skilled person is an engineer skilled in the
design of threaded pipe joints. However, such a skilled
person will not necessarily be familiar with the
natural-gas and oil extraction industry.

2.4   Calculating NVV

Although both parties agreed that the skilled person
knows how to calculate the actual amount of empty space
present within a joint, for example, using a computer
aided design (CAD) system, the disclosure of the

invention indicates a different course of action so
that "*NVV <u>must</u> be calculated*" (underlining added by the
board) as set out in paragraphs [0038] and [0039] of
the patent in suit.

Thus, the argument advanced on behalf of the appellant,
that the calculations and equations set out in
paragraph [0039] merely explain the approximate,
possibly wrong, calculations made by the inventor in
arriving at the equation NVV[cm^3] ≤ 4 × OD[inch] of
claim 1, cannot be followed, because it is contradicted
by the language used in the disclosure of the
invention.

Paragraph [0039] discloses that "*the extension of said
spaces <u>must</u> be calculated considering*" (underlining
added by the board) the "*total empty area in the
thread*" G_T and "*other empty spaces*" G_C which are then
used in the above final equation to calculate *NVV*.

2.4.1   "*Total empty area in the thread*" G_T

According to paragraph [0039] the total empty area in
the thread G_T is defined as "*the effective space on the
sides of the threads and between crests and roots when
the two threads are mutually engaged in the nominal
configuration*". The description remains silent
concerning the nature of the "*nominal configuration*".

The adjective "*nominal*" typically refers to the ideal
dimension of a component starting from which tolerances
may be defined in the positive (component will be
larger than ideal) or negative (component will be
smaller than ideal) directions. However, in the case of
a thread, the situation appears to be different,
because the essential principle is that the actual

profiles of both the nut and bolt threads must never
cross or transgress the theoretical profile.
Practically, to make a thread, tolerances must be
applied to ensure that this essential principal always
applies. These tolerances merely specify a band of
values for, say, the major diameter and the pitch
diameter (e.g. ISO 965 ISO general purpose metric screw
thread—tolerances) and will influence the space between
the respective thread on the nut and bolt. Thus, in the
case of a thread there is not necessarily any ideal
value which would correspond to a "*nominal configura-
tion*". Furthermore, when a nominal configuration has
nevertheless been defined, it may not be unique. For
example, document D07, figure 5 discloses differing
"*power-tight*" and "*hand-tight*" configurations of a pin
and box joint. However, the disclosure of the invention
does not provide further guidance for determining the
"*nominal configuration*". The argument advanced on
behalf of the appellant, that what is shown in catalo-
gues constitutes the "*nominal configuration*", was
neither further substantiated nor is there any indica-
tion to this effect to be found in the patent in suit.
Thus, reference to an undefined "*nominal*" configuration
adds an arbitrary element to the calculation.

According to Paragraph [0039], the calculation is made
using the following formula:

$$G_T = g_T \times (PTL + ITL \times k) \times TPI$$

where

"G_T *is the total empty area in the thread* [mm^2]
PTL is the perfect-thread length [ins]
ITL is the imperfect-thread length [ins]
TPI is the number of threads per inch [ins^{-1}]
*k   is a constant which assumes that in the imperfect-
      thread length the empty spaces are greater than*

*the empty spaces in the perfect thread on account
of the crests of the threads that are cut*".

The patent in suit does not contain any further
explanations concerning the *perfect-thread length PTL*
or the *imperfect-thread length ITL*, or the nature of
the imperfections referred to. In particular, although
some standards (for example those of the American
Petroleum Institute) may also use such vocabulary,
there is no indication that the patent should only be
understood in connection with a particular standard.

Although it is stated in paragraph [0039] that the
parameter "*k*" has the value 5 in the above formula,
there is no example of how it "*is calculated [by]
simulating the engagement of the threads in a portion
of imperfect thread*" or whether the value 5 is to be
used in all cases.

The parameter g_T is only mentioned in the above equation
but is not otherwise explained in paragraph [0039].
However, the skilled person would assume that it is the
same parameter g_T which is explained in paragraphs
[0033] and [0034] and which can either be calculated on
the basis of the area 5 of figure 2 or on the basis of
area 6 of figure 3. However, these two calculations
necessarily yield different results, since one is only
an approximation of the other. The patent in suit is
silent about the significance of the difference or
which one should be used for the above formula of
paragraph [0039].

2.4.2 Calculations to be determined before or after
       application of the dry lubricant

According to the minutes of the oral proceedings before the opposition division, the appellant indicated that "*the volume needed to accommodate the dry lubricant is designated as NVV*" (point 5) but later changed this to "*this volume is added to the lubricant, as is clear from paragraphs [0025], [0026] and [0035] of the patent specification*" (point 12). In the contested decision, the opposition division considered that "*the nominal void volume must be calculated before the dry lubricant is applied*" (point 13.1.1). According to the grounds of appeal, the appellant now indicates that "*…nominal values [are] determined before considering the layer of dry lubricant, as the voids are aimed at accommodating the dry lubricant*" and the same paragraphs [0025], [0026] are now advanced for the opposite conclusion (page 04/25, lines 1 to 20 of the grounds of appeal). No reasons were advanced for these changes of position.

Paragraphs [0025] and [0026] of the patent in suit only indicate that a reduction of the empty spaces in the joint increases its performance and thus constitutes an optimisation of the joint - a statement which remains true whether the "*empty space*" in the joint is defined to include the space to be occupied by dry lubricant or not. These paragraphs thus do not shed any light on the issue of whether the "*empty space*" is to be calculated before or after dry lubricant is positioned in the joint.

According to claim 1 (respectively according to the fourth to seventh auxiliary request) and paragraph [0032], a dry lubricant coating thickness between 5μm and 30μm should be considered, but this does not shed any light on the issue of whether the empty space is to be calculated before or after dry lubricant is positioned in the joint.

Paragraphs [0033] to [0035] and [0039] and claim 1
(respectively according to the fourth to seventh
auxiliary request) are ambiguous as to whether the
parameters g_T and G_C i.e. the "*free space between
threads engaged in the section of the joint*" and the
"*other empty spaces*" are to be determined before or
after application of the dry lubricant.

Thus, the skilled person (see point 2.3 above) cannot
determine whether the empty spaces (g_T and G_C) in the
joint should be calculated before or after application
of the dry lubricant.

It was argued on behalf of the appellant that the issue
might be resolved by testing before and after the
coating (of dry lubricant) was laid (page 05/25, second
full paragraph, of the grounds of appeal). However,
neither the nature of the tests nor any criteria for
deciding the outcome were presented. In addition, no
such tests or decision criteria are disclosed anywhere
in the patent in suit. Thus, there is no concrete basis
for concluding that the issue might be resolved through
testing.

2.4.3   "*other empty spaces*" G_C

According to paragraph [0039], the "*other empty spaces
G_C*" are designated by 7 of the joint illustrated in
Figure 4 and "*must be calculated when the male element
and the female element are mated in the nominal
configuration*". There are no statements in the
description as to how the particular example shown in
figure 7 would carry over to threaded pipe joints in
general as claimed in claim 1, respectively according
to the fourth to seventh auxiliary request.

2.4.4 Thus, the skilled person wishing to calculate the
       quantity *NVV* is confronted with the following problems
       which are not resolved in the patent in suit:
       -       it is not clear what "*nominal*" configuration of
               the joint is referred to for calculating the
               "*nominal void volume NVV*" when considering two
               engaged screw threads in general, given that the
               length of engaged thread necessarily affects the
               "*amount of empty space present within the joint*";
       -       similarly, it is not clear whether the "*nominal
               void volume NVV*" calculations are carried out on
               the basis of the voids between the threads before
               or after the coating of dry lubricant has been
               applied. However, this issue is fundamental to any
               "*optimi[sation of] all the dimensions of the joint
               so as to reduce the total volume of the void space
               present therein*" (paragraph [0026]);
       -       although vocabulary such as "*perfect-thread length
               PTL*" "*imperfect-thread length ITL*" appears in API
               standard D07, it is not clear whether the meaning
               these expressions have in a particular standard is
               being referred to. Furthermore, if the pipes are
               designed according to a different standard, it it
               not clear how *PTL* and *ITL* are to be determined;
       -       although the parameter "*k*" has the value 5 in the
               description, there is no example of how it "*is
               calculated [by] simulating the engagement of the
               threads in a portion of imperfect thread*" or
               whether the value 5 is to be used in all cases;
       -       the definition of the "*other empty spaces*" G_C
               remains vague and open to arbitrary interpreta-
               tions;
       -       the two ways of calculating the parameter g_T given
               in the description would appear to yield different
               results, because one is an approximation of the

other. It is not clear which one should be used
when evaluating the index *NVV*.

For all these reasons, the skilled person would not
know how to resolve the above issues in order to
calculate *NVV* according to the invention.

Furthermore, assuming, for the sake of argument, that
the person skilled in the art wishing to practice the
invention were able to calculate a sensible value for
NVV for a given thread, then, if on finding that this
NVV does not meet the requirement set out in claim 1,
the patent in suit does not provide the skilled person
with any teaching as to how "*to optimize <u>all the
dimensions of the joint</u> so as to reduce the total
volume of the void space present therein*" (paragraph
[0026], underlining added by the board). In particular,
there may be added difficulties when particular
standards (e.g. document D07) also have to be met.
Without such teaching, the skilled person has to start
a research program as to which parameters of the thread
should be changed by what amount.

It was argued on behalf of the appellant, that the
calculations and equations set out in paragraph [0039]
provide at least one manner of calculating NVV for a
skilled person from the natural-gas and oil extraction
industry and who knows what is meant by the perfect
thread length (PTL), the imperfect thread length (ITL)
and nominal configuration of such a the joint. However,
as set out in point 2.3 above, such a choice of skilled
person is not warranted by the more general scope of
the claim and this does not address other issues such
as the presence or not of the dry lubricant or on what
basis the parameter *k* is to be determined.

2.5   For all the above reasons, the person skilled in the
       art of threaded joints cannot reliably calculate a
       value for *NVV* as used in claim 1 (respectively
       according to the fourth to seventh auxiliary request)
       for carrying out the invention.

       The invention is thus not disclosed in a manner
       sufficiently clear and complete for it to be carried
       out by a skilled person (Article 83 EPC 1973).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Meyfarth   M. Poock

Decision electronically authenticated