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**Datasheet for the decision  
of 21 March 2017**

**Case Number:** T 1796/15 - 3.4.02

**Application Number:** 03740766.5

**Publication Number:** 1518113

**IPC:** G01N29/26, G01B17/02

**Language of the proceedings:** EN

**Title of invention:**

A METHOD AND APPARATUS FOR ULTRASONICALLY INSPECTING THE  
INTEGRITY OF A TUBULAR

**Patent Proprietor:**

Varco I/P, Inc.

**Opponent:**

GE Sensing & Inspection Technologies GmbH

**Headword:**

**Relevant legal provisions:**

EPC 1973 Art. 54, 56, 111(1)

**Keyword:**

Novelty - main request (yes)

Inventive step in view of documents D2 and D13 - main request  
(yes)

Remittal to the department of first instance - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 1796/15 - 3.4.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.02**  
**of 21 March 2017**

**Appellant:** Varco I/P, Inc.  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 9 July 2015  
revoking European patent No. 1518113 pursuant to  
Article 101(3) (b) EPC.**

**Composition of the Board:**

**Chairman** R. Bekkering  
**Members:** H. von Gronau  
T. Karamanli

## **Summary of Facts and Submissions**

I. The appeal of the patent proprietor is directed against the decision of the opposition division to revoke the European patent. The opposition division revoked the patent in particular on the ground that the independent claims of the patent as granted and the independent claims of the first and second auxiliary requests then on file did not involve an inventive step.

II. In its statement of grounds of appeal the appellant alleged a substantial procedural violation in the opposition proceedings because it was not allowed to file an amended third auxiliary request in response to a prior-art document introduced shortly before the oral proceedings and requested that the decision of the opposition division be set aside in its entirety, the case be remitted to the opposition division and the appeal fee be reimbursed.

In the case that the board did not find that a substantial procedural violation had occurred, the appellant alternatively requested that the decision of the opposition division to revoke the patent be set aside in its entirety, and that the patent be maintained with the claims of the patent as granted or with the claims of the first to third auxiliary requests filed with the grounds of appeal.

Oral proceedings were also requested in the event that the board was minded to refuse any of these requests.

III. In its reply to the grounds of appeal, the respondent (opponent) was of the opinion that during the first-instance proceedings no substantial procedural violation had occurred, and that the subject-matter of

the granted claim 1 did not involve an inventive step. Furthermore, the independent claims of the first to third auxiliary requests did not fulfil the requirements of Articles 123(2) and 56 EPC. The respondent therefore requested that the appeal be rejected or, if the board was minded to maintain the patent in amended form according to one of the auxiliary requests, that the case be remitted to the department of first instance for also considering the alleged prior use. It also requested to hold oral proceedings in case none of these requests could be allowed.

- IV. In a communication according Article 15(1) RPBA, the board expressed the provisional opinion that a remittal of the case to the department of first instance according to the appellant's aforementioned request because of a substantial procedural violation would not be justified. With respect to claim 1 of the patent as granted the board expressed the provisional opinion that its subject-matter involved an inventive step in view of document

D2 : EP 0 444 800 A

as closest prior art and document

D13 : US 4 597 294 A.

- V. With a letter dated 21 February 2017 the appellant filed claims according to a second to seventh auxiliary request to be considered by the board together with the first auxiliary request, filed with the statement of grounds of appeal, in case the board did not remit the case following a negative decision on the main request,

i.e. the patent as granted. The appellant also filed arguments in support of its requests.

VI. In the evening of 17 March 2017 the respondent submitted by fax a letter to the board in preparation of the oral proceedings. With this letter the respondent referred for the first time in the appeal proceedings to the document

D10: US 3 968 681 A

and submitted that this document in combination with document D2 rendered obvious the subject-matter of claim 1.

In the course of the oral proceedings the respondent also referred for the first time in the appeal proceedings to document

D11: JP 59 010 802

to be combined with document D2 for the assessment of inventive step.

Documents D10 and D11 had already been introduced by the opposition division with its communication annexed to the summons to oral proceedings.

VII. Oral proceedings before the board took place on 21 March 2017. In the course of the oral proceedings the appellant informed the board that it had not received a copy of the respondent's letter of 17 March 2017 and therefore the board provided the appellant with a copy of that letter.

The appellant objected to the respondent's letter of 17 March 2017 being admitted into the appeal proceedings since it had been filed at a very late stage of the appeal proceedings and in addition in German. The Board informed the parties that, if the decision under appeal were to be set aside, because the opposition division's finding on inventive step with regard to documents D2 and D13 was not valid, and the case were to be remitted to the department of first instance for further prosecution, the question of whether the respondent's letter of 17 March 2017 should be admitted into the appeal proceedings would no longer be relevant.

The appellant withdrew its request that the case be remitted to the opposition division because of a procedural violation and its request for reimbursement of the appeal fee.

The parties' final requests were as follows:

The appellant requested that the decision under appeal be set aside and that the case be remitted to the department of first instance for further prosecution (main request). The appellant further requested that, in the event the board did not remit the case on the basis of the patent as granted, that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the claims of the first auxiliary request filed with the statement of grounds of appeal or of one of the second to seventh auxiliary requests, all filed with letter of 21 February 2017.

The respondent requested that the appeal be dismissed (main request). As an auxiliary request, the respondent requested that the decision under appeal be set aside

and that the case be remitted to the department of first instance for examination of the alleged prior use and for further examination of the prior-art documents already on file.

At the end of the oral proceedings, the chairman announced the decision of the board.

VIII. Claim 1 of the patent as granted reads as follows:

"A method of inspecting the integrity of a tubular (15) with a rotary-type ultrasonic inspection head (13), which method comprises the steps of:

(a) dividing the length of said tubular into a continuous series of length increments and with an ultrasonic inspection means (12) taking measurements representative of the wall thickness around substantially the entire circumference at each length increment along substantially the entire length of said tubular;

(b) during step (a) measuring the longitudinal position of ultrasonic inspection means (12) relative to said tubular, and associating each measurement to a particular length increment;

(c) generating electronic data from said measurements representative of the wall thickness over substantially the entire tubular; and

(d) electronically storing substantially all of said electronic data, the storage of data representing wall thickness over substantially the entire tubular facilitating both estimation of the overall mechanical



properties of the tubular and identification of localised defects;

characterised in that step (a) comprises the step of progressively taking said measurements around the circumference of said tubular (15) by dividing the circumference of each length increment into a continuous series of segments, and for each length increment taking a plurality of measurements in each segment around said circumference, and electronically determining and storing a maximum, minimum and average wall thickness measurement for each segment, and in that step (b) comprises the steps of measuring the circumferential position of said ultrasonic inspection means (12) relative to said tubular as each measurement is taken, associating each measurement with its respective circumferential position, and using said circumferential position to group measurements into said segments, whereby determination of said maximum, minimum and average wall thickness for each segment is facilitated."

IX. The **opposition division** considered document D13 as a starting point for the assessment of inventive step and found: "*D13 discloses a method of inspecting the integrity of a tubular with a rotary type ultrasonic inspection head (abstract, D13), which method comprises the steps of:*

*(a) dividing the length of said tubular into a continuous series of length increments and with an ultrasonic inspection means taking measurements representative of the wall thickness around substantially the entire circumference at each length increment along substantially the entire length of said tubular (each length increment corresponds to one complete helical rotation of the probe, see col. 14,*

lines 36-39 in connection with col. 15/16, line 8 (the dimension of the newdat array in length direction equals to 70), and in connection with col. 19/20, line 19 from below, D13);

(b) during step (a) measuring the longitudinal position of ultrasonic inspection means relative to said tubular (94, fig. 7 and col. 12, lines 14-16, D13), and associating each measurement to a particular length increment (col. 14, lines 36-39 and "section 4" listing of the computer program, col. 19/20 and col. 21/22, D13);

(c) generating electronic data from said measurements representative of the wall thickness over substantially the entire tubular (fig. 15 and col. 11, line 63 - col. 13, line 7, D13); and

(d) electronically storing substantially all of said electronic data, the storage of data representing wall thickness over substantially the entire tubular facilitating both estimation of the overall mechanical properties of the tubular and identification of localised defects (col. 14, lines 20-25 and data arrays "IDAT" and "NEWDAT", col. 15/16, lines 5-8, D13);

wherein step (a) comprises the step of progressively taking said measurements around the circumference of said tubular by dividing the circumference of each length increment into a continuous series of segments, and for each length increment taking a plurality of measurements in each segment around said circumference ("300 segments in circumferential direction", see col. 14, lines 36-39 in connection with col. 19/20, section 4, listing of the computer program, D13), and electronically determining and storing an average wall thickness for each segment (col. 19/20, line 18 from below, section 4, listing of the computer program, D13), and in that step (b) comprises the steps of measuring the circumferential position of said

*ultrasonic inspection means relative to said tubular as each measurement is taken, associating each measurement with its respective circumferential position, and using said circumferential position to group measurements into said segments (col. 8, line 66-68 and col. 14, lines 36-39, D13).*

*Thus claim 1 differs from D13 in that additionally a maximum and a minimum wall thickness for each segment is electronically determined and stored.*

*The skilled person who sees the problem of better characterizing each segment would know that it is known from D2 to additionally determine and store a maximum and a minimum wall thickness for each segment (see page 6, line 56 - page 7, line 14, D2).*

*By combining the teaching of D13 and D2 the skilled person would thus arrive at the subject matter of the present claim 1 without involving any inventive activity." (cf. point 1.1 of the reasons for the decision).*

X. The arguments presented by the **appellant** are essentially as follows:

(a) Interpretation of claim 1 as granted

The appellant was of the opinion that both the respondent and the opposition division had misinterpreted how claim 1 defined:

- (i) the distribution of the length increments and circumferential segments on the tubular; and
- (ii) the distribution of wall thickness measurements on the tubular.

Regarding (i), claim 1 required division of the length of the tubular into a continuous series of length increments. The skilled person would understand that

"the length" was the whole length of the tubular, not some part of it. For example, considering a pipe of 10m length, if asked what the length of that pipe was, it would be odd if the reply were 2m, or some other part of the entire length. The natural reply would be the entire length, i.e. 10m. Step (a) of claim 1 required dividing the length into a series of increments, and this had to mean that the whole length of the tubular was divided into this series of length increments.

Furthermore, the characterising portion of claim 1 required circumferential segments to be formed by dividing each length increment into a continuous series, the division taking place as part of the step of taking wall thickness measurements. Thus, the whole surface of the pipe was divided into a continuous series of length increments and circumferential segments corresponding to dedicated areas of the pipe surface.

Regarding (ii), step (a) of claim 1 referred to wall thickness measurements being taken both around substantially the entire circumference and along substantially the entire length. Here 'substantially' referred to the fact that measurements would not be taken at literally every single point over the entire length and circumference of the tubular, but that there would be some gaps between each measurement on the tubular surface (see column 5, lines 48-50, of the patent). The size of the gaps was dependent (amongst other things) on the rotation speed of the inspection head, the linear speed of the tubular and the frequency of ultrasonic pulses.

(b) Inventive step - claim 1 as granted

- Document D2 in combination with document D13

For the person skilled in the art starting from D2 it would not be obvious to consider document D13. The skilled person would understand that document D13 related to a secondary inspection technique for inspecting a particular part of a heat exchange tube identified by some other primary inspection technique. Since a localized inspection technique did not help with assessment of the overall mechanical properties of the entire pipe, the skilled person would not combine document D2 with document D13 in an obvious way to solve the technical problem.

However, if the board believed that documents D2 and D13 could be combined, the appellant concurred that the teaching of document D13 could be applied to the method disclosed in document D2 as follows: the method of D2 was used to examine length inspection blocks online, i.e. during pipe manufacture. Once the pipe had been cut into individual lengths, those length inspection blocks that were found to 'fail' the online inspection method of document D2 could be inspected offline with the method of document D13 to better analyse the properties of those regions. In particular the skilled person learned from document D13 to select particular regions of the pipe length in which the volume of lost wall material could be calculated.

But the skilled person would also notice that document D13 only described how to work with a single transducer, whereas document D2 described a multiple transducer head. So the skilled person also faced the technical problem of how to make the single transducer method of D13 work with the multiple transducers of document D2. There was no suggestion in document D13 how this could be done.

Furthermore, the algorithm disclosed in document D13 to remove tape drop outs replaced values in each column of the IDAT array where there were suspected tape dropouts. Following this processing, there was no way to determine whether any particular row of the IDAT array represented a real voltage value and its rotational and axial position on the pipe, or whether any one or more of the elements in the row had been replaced with a value up to 10 elements away. The algorithm condensing the IDAT array (i.e. voltage values indicating thickness) into the NEWDAT array having 300 points was by averaging of voltage values located on a line (i.e. a small part of the helical line traced by the transducer). The average of values on a line was not the same as averaging values included in a dedicated area of the pipe surface as defined in the claim.

The appellant further submitted that there was only one way the skilled (but unimaginative) person might try to implement document D13 in document D2: process each revolution of each transducer in the way described in document D13. The result was that the data of each revolution of each transducer was condensed to 300 points. This was an increase over the 96 points per revolution suggested in D2 (cf. page 6, line 26), thereby permitting a better estimation of the overall mechanical properties. But the 300 points generated by the technique of document D13 would represent averages generated from values taken on the helical line traced by each transducer in document D2. Accordingly, document D13 did not suggest to the skilled person that the circumference of each inspection block in D2 should be divided into a continuous series of segments, thereby defining dedicated circumferential areas of the

pipe surface as required by claim 1, determining which values fell in each area and then calculating maximum, minimum and average for each area.

Claim 1 thus embodied a completely new way of generating wall thickness data to describe the tubular being inspected. Both documents D2 and D13 described 'one dimensional' averages: in document D2 this was by looking at a particular slice of the pipe and averaging all values found within that slice - it was one dimensional as the average was just concerned with values falling within a particular length of the pipe; in D13, averaging took place along a section of a line - the line happened to be a helical path on the pipe surface, but it was one dimensional because the line had no width, only a length.

The insight underlying claim 1 was that dedicated circumferential areas (i.e. in two dimensions) of the pipe could be defined independently of the wall thickness measurements. In this way, the location of the wall thickness measurements contributing to an average was taken from an area of the pipe, not from a helical line on the pipe surface. The dedicated circumferential areas were defined by dividing the circumference of each length increment into a continuous series of segments. In this way, wall thickness measurements could be grouped into each dedicated area, whether they were generated by different transducers (possibly inside different probes positioned at different rotational positions on the inspection head), or by the same transducer as it moved along the length of the pipe and passed repeatedly through the area. By dividing the whole length of the tubular into such dedicated areas, and processing the data at the point of inspection as set out in claim 1, the volume of data to be stored was greatly reduced,

but a customer could still classify the overall mechanical properties of each tubular. Neither document D2 nor document D13 contained any hint or clue that dividing a length increment of a tubular into circumferential segments, thereby forming dedicated areas on the pipe surface, would bring about this effect.

The quarter turn method disclosed in document D2, page 7, line 43 to page 8, line 5 was a separate embodiment to determine the pass/fail of a tube. As was visible from figure 7B, for a selected quarter turn with 24 consecutive points a fail indicative event was generated when the tolerance upper limit was shown in excess of the consecutive 24 points. Document D2 did not disclose or suggest that an average, minimum or maximum value was calculated over these 24 points of the quarter turn. It did not disclose either that consecutive quarter turn segments of a length increment were selected. The next quarter turn segment could also be in the next length increment.

- Document D13 in combination with document D2

With respect to a combination of document D13 with document D2, the appellant was further of the opinion that distinguishing features between claim 1 and document D13 had not been correctly identified. Since the total inspection region in D13 was a particular area of the heat exchange tube and not its whole length, it was not clear how the opposition division or the respondent concluded that D13 disclosed the feature of claim 1 that the whole length was covered by a continuous series of length increments. The argument of the respondent that document D13 was relevant because claim 1 required measurements to be



taken over substantially the entire length of the tubular, thereby including the possibility that only some fraction of the tubular length was inspected (cf. page 6, third paragraph of the response), was not persuasive, as this was not a meaning of claim 1 that the skilled person would recognise since "substantially" simply indicated that measurements were not taken at literally every point on the tubular. In fact, the skilled person would understand that claim 1 required the whole length to be divided into length increments, and that every length increment was inspected.

Regarding the division of the circumference into segments, D13 did not disclose dividing the circumference of the length increment into a continuous series of circumferential segments to form dedicated areas on the pipe surface into which wall thickness values were grouped. In fact, D13 selected groups of elements in the array IDAT, each group corresponding to a part of the helical line traced by the transducer, although D13 did not put it in those terms. Furthermore, D13 did not clearly and unambiguously disclose averaging values in each group of elements. D13 described a special 'average', and not a conventional average of the elements in each group. Even if one assumed that the NEWDAT array did utilise circumferential segments during the inspection process, it would be apparent that document D13 did not disclose forming these circumferential segments over the entire length of the tubular.

Accordingly, claim 1 differed from document D13 by at least the following features:

- dividing the entire tubular into a continuous series of length increments;

- taking wall thickness measurements in all length increments along substantially the entire length of the tubular;
- storing data for the entire tubular to facilitate estimate of mechanical properties;
- dividing the circumference of each length increment into a continuous series of segments, whereby each segment is a dedicated circumferential area on the tubular independent of the locations of wall thickness measurements;
- using a position of each wall thickness measurement to group the wall thickness measurements into the pre-defined segments;
- determining maximum, minimum and average wall thickness within each segment (i.e. dedicated area) and storing the result.

Both the opposition division (end of section 1.1: page 6, third paragraph of the contested decision) and the respondent (cf. page 7, fourth paragraph of the reply dated 30 March 2016) incorrectly framed the objective technical problem as "to characterize the wall thickness within a segment more precisely". It was immediately apparent that this formulation contained an impermissible pointer to the solution (i.e. better or more precise characterisation). Therefore, the reasoning of the opposition division and view of the respondent was fundamentally flawed, and should be rejected by the board.

D2 was concerned with a different technical problem, namely an online inspection technique in which a steel pipe was divided into longitudinal sections as the wall thickness measurements were being taken. A pass/fail discrimination was made about each longitudinal section. Application of the online inspection technique

of D2 to improve the post-inspection data analysis method of document D13 was only possible with impermissible hindsight.

Furthermore, D2 was not compatible with D13. An important concept in document D2 was the reduction of wall thickness measurements for the purposes of making the pass/fail discrimination (see page 4, lines 29-35). The application of this concept in the method of document D13 would render document D13 unable to determine the volume of material lost from a selected region of the heat exchange tube (because there would be insufficient wall thickness data after processing in the way set out in D2). Accordingly, the skilled person would not combine D2 with D13 in an obvious way.

XI. The **respondent** presented essentially the following arguments:

(a) Inventive step - claim 1 as granted

- Document D2 in combination with document D13

The respondent was of the opinion that the person skilled in the art would consider document D13 to find a solution for the technical problem when starting from D2 to better estimate the mechanical properties of the pipe. As analysed by the opposition division this document disclosed progressively taking measurements around the circumference of a tubular along a helical path. According to the program code initially 1000 measurements were taken at each winding and these measurements were grouped to get 300 groups in one winding. These groups corresponded to the claimed segments. Therefore document D13 disclosed ring like increments which are divided into segments. It was already disclosed in document D2 to calculate average,

minimum and maximum values to estimate the mechanical properties of the tubular. These calculations just had to be applied to these segments disclosed in document D13 to better estimate the mechanical properties of the tube. This was general practice for a person skilled in the art and could be done without inventive contribution. In this way more localized data were created which led to an enhanced process. Documents D2 and D13 followed the same concept of measuring points in one revolution or slice. The only difference being the slice divided in segments. How the calculations were put into practice was shown in documents D2, at page 6, line 56 to page 7, line 10, where equation 1 defined the averaging process. The goal of document D13 was to inspect the overall mechanical quality of the tube. Therefore the person skilled in the art would take the teaching of document D13 to solve the technical problem.

Furthermore, document D2 already proposed to classify the tubes in quarter turn segments, as disclosed on page 7, line 43 to page 8, line 5. A tube would be regarded as defective if in one of the quarter-turn segments the measured values were below a threshold level. Then the next quarter-turn segment was examined (cf. document D2, page 8, line 1). Therefore, in this embodiment the tube increment was divided into a series of continuous segments on which obviously the same calculations were applied as for the length increments.

The respondent added that the drop out removal mentioned in document D13 was just an option which need not occur. In case drop outs were not detected, measuring values were not replaced.

Furthermore, it was not true that the measuring line on the helical path in document D13 had no width. Each measurement covered a certain area of the tube so that the measuring line had a certain width.

(b) Document D13 in combination with document D2

In its reply to the grounds of appeal, pages 6 to 8, the respondent agreed essentially with the finding of the opposition division. The respondent identified as a possible second distinguishing feature the step that measurements were taken along substantially the entire length of said tubular.

With respect to the first distinguishing feature (additionally a maximum and a minimum wall thickness for each segment is electronically determined and stored) the respondent identified the effect to be the determination of the maximum and the minimum wall thickness within a segment. This resulted in the technical problem to better characterize the wall thickness within a segment.

With respect to the second differing feature the effect was to provide wall thickness measurements for the whole tubular, which resulted in the technical problem to gather information over the whole of the tubular.

To solve the first technical problem the person skilled in the art would recognize that document D2, being of the same technical area as the claimed invention that is to say the verification of the integrity of tubulars, disclosed to determine minimum and maximum values of a segment. Without inventive activity the person skilled in the art would apply this teaching to the method of document D13.

To solve the second technical problem of gathering information over the whole of the tubular the person

skilled in the art would not only apply the method disclosed in document D13 at regions that had been recognized as weakened but essentially along all the tubular.

## **Reasons for the Decision**

1. The appeal is admissible
2. Patent as granted (main request) - claim 1 - novelty (Article 54(1) EPC 1973)

Lack of novelty was not an issue in the contested decision. During the appeal proceedings the respondent did not dispute the novelty of the subject-matter of claim 1.

3. Patent as granted (main request) - claim 1 - inventive step (Article 56 EPC 1973)

### 3.1 Interpretation of the claim

The board concurs with the appellant that claim 1 requires dividing the length into a series of increments, and that this means that the whole length of the tubular is divided into this series of length increments. Furthermore, the characterising portion of claim 1 requires circumferential segments to be formed by dividing each length increment into a continuous series. Thus, the whole surface of the pipe is divided into a continuous series of length increments and circumferential segments corresponding to dedicated areas of the pipe surface. According to claim 1, the

measuring points need not cover the entire tubular surface, but a plurality of measurements are taken in each segment.

3.2 The closest prior-art document

3.2.1 The opposition division decided that the subject-matter of claim 1 did not involve an inventive step in view of documents D13 and D2. The opposition division was of the opinion that document D13 disclosed most of the features of claim 1 and that the subject-matter of claim 1 differed from the disclosure of D13 in that additionally a maximum and a minimum wall thickness for each segment was electronically determined and stored.

3.2.2 During the oral proceedings before the board the parties were of the opinion that document D2 should be regarded as the closest prior-art document.

3.2.3 Thus the issue for the board to consider is whether document D2 or document D13 is to be regarded as closest prior-art document. The aim of the present patent consists in providing an improved tubular integrity inspection method that enables more accurate classification of tubulars, for example classification by mechanical properties such as strength (cf. paragraph [0009] of the patent). Also in the preamble of claim 1 under step (d) it is stated that the stored wall thickness data over substantially the entire tubular facilitates both estimation of the overall mechanical properties of the tubular and identification of localized defects. The invention is therefore directed to an improved estimation.

Document D13 is directed to a method of determining the extent of erosion in the wall of selected portions of

the tubing. Possible areas of wall loss will have been previously located by other inspection techniques (cf. column 10, lines 22-23). The method of document D13 does not divide the length into a continuous series of length increments and calculate classification data of each length increment from measurement data.

Document D2 is directed to a method of inspecting pipes with an ultrasonic wall thickness measuring apparatus capable of measuring the wall thickness of the steel pipe along the whole periphery circumferentially. It divides the length of the pipe in inspection blocks and determines classification data for each block (cf. page 6, line 11 to page 7, line 30 and figure 8). Thus document D2 is directed to the same purpose as that defined in the patent.

According to established jurisprudence of the boards of appeal in selecting the closest prior art, the first consideration is normally that it discloses subject-matter conceived for the same purpose or aiming at the same objective as the claimed invention and has the most relevant technical features in common, i.e. requiring the minimum of structural modifications (see Case Law of the Boards of Appeal, 8th edition, I.D.3.1, second paragraph).

The board concludes therefore that document D2 is to be regarded the closest prior-art document.

### 3.3 Document D2 in combination with document D13

3.3.1 As explained above the board regards document D2 as the closest prior-art document. D2 discloses all the features of the preamble of claim 1. Document D2 does not disclose to divide the circumference of each length increment into a continuous series of segments and to



determine the maximum, minimum and average wall thickness for each such segment from the measurements whose position information coincides with the segment.

- 3.3.2 The **effect** of the differing features is a better estimation of the mechanical properties of the pipe (cf. end of paragraph [0032] of the patent).
- 3.3.3 The board concurs with the parties that the **technical problem** starting from D2 is to better estimate the mechanical properties of the pipe.
- 3.3.4 The board is of the opinion that the person skilled in the art, starting from document D2 and considering the technical problem mentioned above, would also consider document D13 to solve this technical problem.

Document D13 analyses the extent of erosion of tubes and therefore measures the wall thickness to better estimate the mechanical properties of the pipe at vulnerable locations. Ultrasonic means are introduced in the tube and driven to move axially and rotatably inside the tube along an inspection region, so that an emission axis describes a helical path along the respective tube wall. The thickness signal together with position signals indicative of the axial and angular position provides a map of the tube wall in the degraded area (cf. column 2, lines 33-52). An oscilloscope displays the amount and extent of erosion graphically. The displayed map allows interpreting the data. The operator selects up to five regions of the scan for which the maximum depth of the wall scar and the total volume of the material removed are calculated (column 14, lines 44-47). For this purpose the measurements along the helical path are segmented such that there are a plurality of measurements in each

segment around said circumference ("CONDENSE ARRAY INTO 300 PTS", see column 14, lines 36-39 in connection with column 19/20, section 4, listing of the computer program). The disclosed method calculates some average of the points of the measured array for each segment and stores it in a new array (NEWDAT) of predefined length whose indices correspond to angular and axial positions.

The person skilled in the art learns therefore from document D13 to select particular weak regions of the scanned tube to better analyse the properties of these tube regions. It could then apply this teaching to the method of document D2 to better estimate the properties of the weakest portions of the tube by a colour coded plot of these regions.

But the combination of document D2 with document D13 does not suggest dividing each length block of the tube into a continuous series of segments to solve the above technical problem.

The board shares the view of the opposition division that section 4 of the program in document D13, which creates a new array with a reduced number of points by averaging a number of measured points, represents a segmentation of the measuring points along the circumference of the tube. However, even if the measured points that are condensed by averaging into one new point of the NEWDAT array are considered as a segment, there is no incentive, neither from document D13 nor from the common general knowledge of the person skilled in the art to calculate also a minimum value and a maximum value of the measured points for each such segment. The algorithm of document D13 in section 4 of the program does not need minimum and maximum

values of the measured points, but just uses some form of average to reduce ("condens") the number of measurement points. The algorithm of document D13 in section 6 of the program does not need minimum and maximum values of the measured points either, but just uses the points of the new array to calculate the maximum depth of wall scar. Only with hindsight one would apply the idea to have maximum and minimum values of the length increments of document D2 to the segments of document D13. The average value is of help for calculating the depth of wall scar, but not the maximum and minimum values.

Furthermore, the board agrees with the appellant that the quarter turn method disclosed in document D2 does not suggest to divide each length increment into a continuous series of segments. According to document D2 *"the quarter-turn processing is a method of performing the processing on one fourth of the measured data of each probe (which measures 96 points). In other words, the continuous discrimination is performed on  $96 \text{ points} / 4 = 24 \text{ points}$ . For instance, as shown in Fig. 7(b), when the tolerance upper limit is shown in excess of the consecutive 24 points as the result of the quarter-turn processing (in the case of the measured data ②), a fail indicative event is generated. On the contrary, when the tolerance upper limit indicative data is less than the consecutive 24 points (in the case of the measured data of ①, ③ or ④), a pass discrimination is made. The processing of the consecutive 24 points is started in response to the measurement of a level which is not less than the tolerance upper limit and not greater than the control tolerance upper limit. When the level decreases in the course of the processing, it is determined passable and the processing is not effected until the level of the*

*next quarter-turn. Therefore, the conditions of the pass-fail criteria are given as follows: wall thickness tolerance upper limit < continuous 96/4 < wall thickness control tolerance upper limit" (cf. page 7, line 50, to page 8, line 3). From this text passage it becomes clear that the method does not only consider the 24 points of a quarter segment, but counts the points with a value between the tolerance upper limit and the control tolerance upper limit. If the number of consecutive such points is below 24 (quarter turn) then it is a pass and if the number is in excess of these 24 points a fail is indicated. Therefore, more than 24 points are considered and any average, minimum or maximum of these points is not calculated.*

- 3.3.5 The board concludes that document D2 in combination with document D13 and the common general knowledge of the person skilled in the art the subject-matter of claim 1 is not obvious and therefore involves an inventive step.
- 3.4 Document D13 in combination with document D2
  - 3.4.1 The opposition division considered document D13 as a starting point for the assessment of inventive step.
  - 3.4.2 As already set forth under point 3.1 the board concurs with the appellant that the claimed method requires dividing the length into a series of increments, and this means that the whole length of the tubular is divided into this series of length increments. Furthermore, the characterising portion of claim 1 requires circumferential segments to be formed by dividing each length increment into a continuous series of segments. Thus, the whole surface of the pipe is divided into a continuous series of length increments

and circumferential segments corresponding to dedicated areas of the pipe surface. According to claim 1, the measuring points need not cover the entire tubular surface, but a plurality of measurements are taken in each segment.

Therefore, the board agrees with the appellant that claim 1 differs from document D13 by the following features:

- dividing the entire tubular into a continuous series of length increments;
- taking wall thickness measurements in all length increments along substantially the entire length of the tubular;
- storing data for the entire tubular to facilitate estimate of mechanical properties;
- dividing the circumference of each length increment into a continuous series of segments, whereby each segment is a dedicated circumferential area on the tubular independent of the locations of wall thickness measurements;
- using a position of each wall thickness measurement to group the wall thickness measurements into the pre-defined segments;
- determining maximum, minimum and average wall thickness within each segment and storing the result.

These differing features allow a localized classification of the entire tubular.

- 3.4.3 The opposition division has identified the technical problem to be better characterizing each segment. The board cannot agree. Document D13 does not address the question to classify certain segments of the tube. The purpose of forming the average of a number of measuring points in document D13 is to make the array of

measurements smaller. The expression "characterizing each segment" contains already a pointer to the claimed solution. The board would see the technical problem to be estimating better or differently the mechanical properties of a tubular.

3.4.4 The board further agrees with the appellant that the method of document D2 is not compatible with that of document D13. An important concept in document D2 is the reduction of wall thickness measurements for the purposes of making the pass/fail discrimination. The application of this concept in the method of document D13 would render document D13 unable to determine the volume of material lost from a selected region of the heat exchange tube because there would be insufficient wall thickness data after processing in the way set out in D2. Further, the person skilled in the art could apply the teaching of document D2 to divide the length of the tubular into a continuous series of length increments, but document D2 does not teach to divide the length increments into a continuous series of segments. Accordingly, the skilled person would not combine document D2 with document D13 in an obvious way and arrive at the claimed method.

3.4.5 The board concludes that even in a combination of document D13 with document D2, the subject-matter of claim 1 is not obvious and involves an inventive step.

4. Remittal to the department of first instance (Article 111(1), second sentence, EPC 1973)

4.1 According to its main request, the appellant requested that the case be remitted to the department of first instance for further prosecution. The respondent requested as an auxiliary request that the case be

remitted for examination of the alleged prior use and for further examination of the prior-art documents already on file.

4.2 According to Article 111(1), second sentence, EPC 1973 the Board of Appeal may either exercise any power within the competence of the department which was responsible for the decision appealed or remit the case to that department for further prosecution. An absolute right for the parties to have the present case remitted to the opposition division does not follow from this provision of the EPC. Rather it confers discretionary power to the board, under due consideration of all circumstances of the case, whether or not to remit the case to the department of first instance.

4.3 In its decision, the opposition division did not deal with any other prior-art document with respect to the subject-matter of granted claim 1. Also, in its reply to the grounds of appeal, the respondent did not rely on any other prior-art document. Only in its letter dated 17 March 2017 (a copy of which was handed to the appellant during the oral proceedings before the board) and in the course of the oral proceedings before the board, the respondent referred to documents D10 and D11 in the appeal proceedings.

Furthermore, the opposition division did not consider the prior use alleged by the respondent in its notice of opposition.

4.4 The respondent argued that, in view of the age of the patent, the case should only be remitted for the examination of the alleged prior use and, therefore, all further prior-art documents on file, in particular document D2 in combination with documents D10 or D11,

should preferably be discussed in the oral proceedings before the board.

4.5 The appellant in the course of the oral proceedings before the board was in favour of a remittal without a discussion on any further prior-art document in spite of the age of the patent, in order to safeguard the party's right to two instances.

4.6 In view of the fact that the opposition division did not consider in its decision documents D10 and D11, which it had introduced into the proceedings, and that during the appeal proceedings the respondent did not refer to documents D10 and D11 and any line of argumentation based on these documents until a few days before the oral proceedings, the board comes to the conclusion that it would not be appropriate to decide on inventive step in view of these documents for the first time in the appeal proceedings.

Also the prior use, which had been alleged in the notice of opposition, was not considered in the decision of the opposition division. However, it is not the function of the board to consider and decide upon questions which had not been dealt with by the department of first instance.

4.7 In view of the above, the board decided to exercise its discretion under Article 111(1), second sentence, EPC 1973 in remitting the case to the department of first instance for further prosecution.



## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution.

The Registrar:

The Chairman:



M. Kiehl

R. Bekkering

Decision electronically authenticated