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Datasheet for the decision of 10 February 2022

Case Number: T 2449/19 - 3.4.02

Application Number: 10703152.8

Publication Number: 2454563

IPC: G01F1/74, G01F1/84, G01N9/00, G01N11/16

Language of the proceedings: EN

Title of invention:
METER ELECTRONICS AND FLUID QUANTIFICATION METHOD FOR A FLUID BEING TRANSFERRED

Applicant:
Micro Motion, Inc.

Headword:

Relevant legal provisions:
EPC Art. 84, 123(2)
RPBA 2020 Art. 13(1), 13(2)

Keyword:
Late-filed amended main request - admitted (no)
Amendments - first and second auxiliary request - allowable (no)
Claims - clarity - first and second auxiliary request (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2449/19 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 10 February 2022

Appellant: (Applicant)	Micro Motion, Inc. 7070 Winchester Circle Boulder, CO 80301 (US)
Representative:	Ellis, Christopher Paul Ollila Law Limited Unit 7 The Courtyard Timothys Bridge Road Stratford upon Avon CV37 9NP (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 8 April 2019 refusing European patent application No. 10703152.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Bekkering
Members:	C. Kallinger
	G. Decker

Summary of Facts and Submissions

I. The appellant lodged an appeal against the decision of the examining division refusing European patent application No. 10 703 152.8 on the basis of Articles 52(1) and 56 EPC.

II. In its decision, the examining division found that the subject-matter of claim 1 (and the corresponding method claim 7) could not be regarded as being inventive over documents D1 or D2 alone or in combination with document D3.

III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims according to the main request that had formed the basis of the appealed decision or alternatively on the basis of the claims according to the first auxiliary request filed with the letter setting out the grounds of appeal dated 16 August 2019.

IV. Oral proceedings were appointed as requested. In a communication pursuant to Article 15(1) RPBA 2020 dated 24 September 2021 the board raised objections under Articles 84 and 83 EPC.

V. In preparation for the oral proceedings the appellant filed with the letter dated 10 January 2022 amended claims according to a main request, a first auxiliary request and a second auxiliary request.

VI. On 10 February 2022 oral proceedings took place during which the appellant filed amended claims according to a new main request.

VII. Appellant's final requests:

The appellant requested as a main request that the decision under appeal be set aside and that a patent be granted on the basis of the claims according to the new main request filed by e-mail during the oral proceedings on 10 February 2022, or alternatively according to the first auxiliary request or the second auxiliary request, both requests filed with the letter dated 10 January 2022.

VIII. Claim 1 of the new main request reads as follows:

"Meter electronics (20) for quantifying a fluid being transferred, the meter electronics (20) comprising an interface (201) configured to communicate with a flowmeter assembly of a vibratory flowmeter and receive a vibrational response and a processing system (203) coupled to the interface (201) including an aeration detect routine (213) to process flowmeter values and configured to determine a volume flow ($\dot{v}_i$) and a density (ρ_i) for a plurality of predetermined time portions (t_i) of the fluid transfer, with the processing system (203) being characterized by being configured to:

execute the aeration detect routine (213), the aeration detect routine (213) configured to vibrate a flowmeter assembly (10) of a vibratory flowmeter (5) during the fluid transfer, compare a vibrational response of the predetermined time portion (t_i) to a predetermined aeration threshold (244), and determine the predetermined time portion (t_i) to be aerated if the vibrational response fails the predetermined aeration threshold (244);

determine if the fluid transfer is non-aerated

during the predetermined time portion (t_i);

if the predetermined time portion (t_i) is non-aerated, then, for all non-aerated predetermined time portions, add a volume-density product to an accumulated volume-density product and add the volume flow to an accumulated volume flow;

determine a non-aerated volume-weighted density ($\rho_{vol\text{-}weighted}$) for the fluid transfer by dividing the accumulated volume-density product ($\dot{\nu}\rho_{accum}$) by the accumulated volume flow;

obtain a fluid viscosity (μ_i) for the predetermined time portion (t_i);

if the predetermined time portion (t_i) is non-aerated, then, for all non-aerated predetermined time portions, add a volume-viscosity product to an accumulated volume-viscosity product; and determine a non-aerated volume-weighted viscosity ($\mu_{vol\text{-}weighted}$) for the fluid transfer by dividing the accumulated volume-viscosity product by the accumulated volume flow."

IX. Claim 1 of the first auxiliary request reads as follows:

"Meter electronics (20) for quantifying a fluid being transferred, the meter electronics (20) comprising an interface (201) configured to communicate with a flowmeter assembly of a vibratory flowmeter and receive a vibrational response and a processing system (203) coupled to the interface (201) including an aeration detect routine (213) to process flowmeter values and configured to determine a plurality of volume flow ($\dot{\nu}_i$) and density (ρ_i) measurements over a predetermined time

portion (t_i) of the fluid transfer, with the processing system (203) being characterized by being configured to:

execute the aeration detect routine (213), the aeration detect routine (213) configured to vibrate a flowmeter assembly (10) of a vibratory flowmeter (5) during the fluid transfer, compare a vibrational response of the predetermined time portion (t_i) to a predetermined aeration threshold (244), and determine the predetermined time portion (t_i) to be aerated if the vibrational response fails the predetermined aeration threshold (244);

determine if the fluid transfer is non-aerated during the predetermined time portion (t_i);

if the predetermined time portion (t_i) is non-aerated, then add a volume-density product ($\dot{v}_i\rho_i$) to an accumulated volume-density product ($\dot{v}\rho_{accum}$) and add the volume flow rate ($\dot{v}_i$) to an accumulated volume flow rate ($\dot{v}_{accum}$);

determine a non-aerated volume-weighted density ($\rho_{vol\text{-}weighted}$) for the fluid transfer by dividing the accumulated volume-density product ($\dot{v}\rho_{accum}$) by the accumulated volume flow rate ($\dot{v}_{accum}$);

obtain a fluid viscosity (μ_i) for the predetermined time portion (t_i);

if the predetermined time portion (t_i) is non-aerated, then add a volume-viscosity product ($\dot{v}_i\mu_i$) to an accumulated volume-viscosity product ($\dot{v}\mu_{accum}$); and

determine a non-aerated volume-weighted viscosity

($\mu_{vol-weighted}$) for the fluid transfer by dividing the accumulated volume-viscosity product ($\dot{\nu}\mu_{accum}$) by the accumulated volume flow rate ($\dot{\nu}_{accum}$) obtain a temperature (T_i) for the predetermined time portion (t_i); if the predetermined time portion (t_i) is non-aerated, then add a volume-temperature product ($\dot{\nu}_i T_i$) to an accumulated volume-temperature-product ($\dot{\nu}T_{accum}$); determine a non-aerated volume-weighted temperature ($T_{vol-weighted}$) for the fluid transfer by dividing the accumulated volume-temperature product ($\dot{\nu}T_{accum}$) by the accumulated volume flow rate ($\dot{\nu}_{accum}$), wherein the processing system (203) is further configured to convert the non-aerated volume-weighted density ($\rho_{vol-weighted}$) to a standard density value using the non-aerated volume-weighted temperature ($T_{vol-weighted}$)."

X. Claim 1 of the second auxiliary request reads as follows:

"Meter electronics (20) for quantifying a fluid being transferred, the meter electronics (20) comprising an interface (201) configured to communicate with a flowmeter assembly of a Coriolis flowmeter and receive a vibrational response and a processing system (203) coupled to the interface (201) including an aeration detect routine (213) to process flowmeter values and configured to determine a plurality of volume flow ($\dot{\nu}_i$) and density (ρ_i) measurements over a predetermined time portion (t_i) of the fluid transfer, with the processing system (203) being characterized by being configured to:

execute the aeration detect routine (213), the

aeration detect routine (213) configured to vibrate a flowmeter assembly (10) of a vibratory flowmeter (5) during the fluid transfer, compare a vibrational response of the predetermined time portion (t_i) to a predetermined aeration threshold (244), and determine the predetermined time portion (t_i) to be aerated if the vibrational response fails the predetermined aeration threshold (244);

determine if the fluid transfer is non-aerated during the predetermined time portion (t_i), and re-execute the aeration detect routine (213) if the fluid transfer is aerated;

if the predetermined time portion (t_i) is non-aerated, then add a volume-density product ($\dot{\nu}_i\rho_i$) to an accumulated volume-density product ($\dot{\nu}\rho_{accum}$) captured over the predetermined time portion (t_i) and add the volume flow rate ($\dot{\nu}_i$) to an accumulated volume flow rate ($\dot{\nu}_{accum}$) captured over the predetermined time portion t_i);

determine a non-aerated volume-weighted density ($\rho_{vol\text{-}weighted}$) for the fluid transfer by dividing the accumulated volume-density product ($\dot{\nu}\rho_{accum}$) captured over the predetermined time portion (t_i) by the accumulated volume flow rate ($\dot{\nu}_{accum}$);

obtain a fluid viscosity (μ_i) for the predetermined time portion (t_i);

if the predetermined time portion (t_i) is non-aerated, then add a volume-viscosity product ($\dot{\nu}_i\mu_i$) to an accumulated volume-viscosity product ($\dot{\nu}\mu_{accum}$) captured over the predetermined time portion (t_i); and determine a non-aerated volume-weighted viscosity ($\mu_{vol\text{-}weighted}$) for the fluid

transfer by dividing the accumulated volume-viscosity product ($\dot{\nu}\mu_{accum}$) captured over the predetermined time portion (t_i) by the accumulated volume flow rate ($\dot{\nu}_{accum}$) captured over the predetermined time portion (t_i)."

Reasons for the Decision

1. New main request - Admission

The new main request was filed during the oral proceedings, although the objections under Article 84 EPC raised by the board in the communication pursuant to Article 15(1) RPBA 2020 were known to the appellant several months before the oral proceedings took place.

The appellant argued with respect to the determination of "*a density (ρ_i) for a plurality of predetermined time portions (t_i) of the fluid transfer*" that the skilled person would interpret this feature such that it made technical sense and therefore would necessarily understand that an average density value had to be used. This interpretation was also supported by the description (see page 16, lines 28 to 30). In addition, even a single instant value could represent an average. As the amendments aimed at overcoming the clarity objection, the amended claims should be admitted into the proceedings.

The board is not convinced by the appellant's arguments for the following reasons. A density measurement usually reflects the density value at a certain point in time. It is not clear how a density value is

determined for a plurality of time portions. For the skilled person, various possibilities for interpreting this feature exist, e.g. calculating an average or mean density value based on several measurements during the plurality of time portions or choosing a single value representing the plurality of time portions (e.g. the maximum or minimum value). The passage referred to by the appellant (page 16, lines 28 to 30) describes that the mass-weighted density can be similar to an average density. However, the passage fails to support the appellant's interpretation that an average density for a plurality of predetermined time portions is determined. Also the other parts of the description fail to support the appellant's interpretation of the feature that "*a density (ρ_i) for a plurality of predetermined time portions (t_i) of the fluid transfer*" is determined. Finally, the board does not share the appellant's interpretation that the claimed determination of a (single) density value represents the measurement of an average.

The board is therefore of the opinion that the amendments in claim 1 are not suitable to overcome the clarity objections and also give rise to new clarity objections under Article 84 EPC.

Furthermore, the new main request was filed only during the oral proceedings, although the objections under Article 84 EPC raised by the board in the communication pursuant to Article 15(1) RPBA 2020 were known to the appellant already several months before the oral proceedings took place.

Therefore, in exercising its discretion in view of the fact that the amendments are not suitable to overcome the previous clarity objections and also give rise to

new clarity objections under Article 84 EPC, and further in view of the current state of the proceedings, the board did not admit the new main request into the proceedings (Article 13(1) and (2) RPBA 2020).

2. First and second auxiliary request

2.1 Admission

In its communication pursuant to Article 15(1) RPBA 2020 annexed to the summons, the board raised for the first time objections under Article 84 EPC. In reaction to these new objections, the first and the second auxiliary request were both filed after the notification of the summons to oral proceedings and one month before the oral proceedings. The board agrees with the appellant's argument that this constitutes exceptional circumstances and therefore admitted both auxiliary requests into the proceedings (Article 13(2) RPBA 2020).

2.2 Amendments

Claim 1 of the first auxiliary request and the second auxiliary request defines the determination of *"a plurality of volume flow ($\dot{v}_i$) and density (ρ_i) measurements over a predetermined time portion (t_i) of the fluid transfer"*. The appellant argued that support for this amendment could be found throughout the application as originally filed, e.g. in Figure 3 and the associated description.

The board is not convinced by this argument. Figure 3 is a block diagram of the meter electronics and fails

to show a plurality of measurements. The description (see page 14, lines 17 and 18) discloses that the predetermined time portions can be chosen to generate a plurality of measurements. With respect to the density measurement, the description (see page 16, lines 10 to 20) only discloses that a density is measured for a predetermined time portion. Therefore, Figure 3 as well as the respective part of the description (from page 14, line 11 to page 21, line 18) fail to disclose that a plurality of volume flow and density measurements are determined over a (single) predetermined time portion.

In conclusion, claim 1 of the first auxiliary request and the second auxiliary request does not meet the requirements of Article 123(2) EPC.

2.3 Clarity

Claim 1 of both requests define the determination of *"a plurality of volume flow ($\dot{v}_i$) and density (ρ_i) measurements over a predetermined time portion (t_i) of the fluid transfer"*. The appellant argued that this amendment overcame the clarity objection raised by the board with respect to the measurement of a density for a predetermined time portion.

The board is not convinced by the appellant's argument for the following reason. The claim initially defines the determination of a plurality of volume flow measurements over a predetermined time portion but later refers to a volume-density product and an accumulated volume flow rate, without defining how the properties volume flow, volume and volume flow rate relate too each other.

In conclusion, claim 1 of the first auxiliary request and the second auxiliary request does not meet the clarity requirements of Article 84 EPC.

3. Further objections

In view of the objections discussed above, there is no need to establish whether the further objections under Articles 84 and 83 EPC raised by the board in its communication pursuant to Article 15(1) RPBA 2020 also prejudice the grant of a patent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

H. Jenney R. Bekkering

Decision electronically authenticated