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# Datasheet for the decision of 24 March 2023

**Case Number:** T 1750/20 - 3.4.02

**Application Number:** 14195059.2

**Publication Number:** 3026424

**IPC:** G01N21/51

**Language of the proceedings:** EN

**Title of invention:**
Nephelometric turbidimeter using a labeled cuvette

**Applicant:**
Hach Lange GmbH

**Headword:**

**Relevant legal provisions:**
EPC Art. 56

**Keyword:**
Inventive step - (no)

**Decisions cited:**

**Catchword:**

Europäisches Patentamt
European Patent Office
Office européen des brevets

**Beschwerdekammern**

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**Case Number: T 1750/20 - 3.4.02**

# D E C I S I O N
# of Technical Board of Appeal 3.4.02
# of 24 March 2023

| | |
|---|---|
| **Appellant:** (Applicant) | Hach Lange GmbH<br>Königsweg 10D<br>14163 Berlin (DE) |
| **Representative:** | terpatent Patentanwälte ter Smitten<br>Eberlein-Van Hoof Rütten Daubert<br>Partnerschaftsgesellschaft mbB<br>Burgunderstraße 29<br>40549 Düsseldorf (DE) |
| **Decision under appeal:** | **Decision of the Examining Division of the European Patent Office posted on 5 March 2020 refusing European patent application No. 14195059.2 pursuant to Article 97(2) EPC.** |

**Composition of the Board:**

| | |
|---|---|
| **Chairman** | R. Bekkering |
| **Members:** | A. Hornung |
| | G. Decker |

## Summary of Facts and Submissions

I. The applicant appealed against the decision of the examining division refusing European patent application No. 14195059.2 on the basis of Article 97(2) EPC because the main and sole request then on file did not fulfil the requirements of Articles 84, 54(1) and 56 EPC.

II. 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 a main request filed by letter dated 11 October 2018.

III. Oral proceedings before the board were held on 24 March 2023.

IV. The following document, which was relied on in the first-instance examination proceedings, is referred to in the present decision:
D8: US 8,724,107 B2.

V. Independent claim 1 in accordance with the main request reads as follows:

"A nephelometric turbidimeter (100) with an annular scattering light detecting arrangement (42) and a cylindrical turbidimeter vial (10), the vial (10) comprising:
a transparent vial body (12) comprising a transparent flat bottom inlet window (16) and a transparent cylinder body (14) with a circular outlet window (20), the transparent outlet window (20) being axially aligned with the scattering light detecting arrangement (42) so that the scattered light leaving the vial horizontally through the

outlet window is received by the annular scattering light detecting arrangement (42),
a cylindrical optical shielding (30) being provided at the cylinder body (14) over a part of the axial length of the cylinder body (14) and axially adjacent to a non-shielded cylinder part serving as the outlet window (20), the shielding (30) optically blocking the inside from the outside of the vial (10),
wherein the optical shielding (30) is provided axially above the outlet window (20) of the cylinder body (14)".

## Reasons for the Decision

1. Inventive step

1.1 The subject-matter of claim 1 lacks an inventive step in view of D8 (Article 56 EPC). The reasons are as follows:

1.1.1 The embodiment shown in figures 5 and 6 of D8 represents the closest prior art.

D8 discloses a nephelometric turbidimeter *[column 3, lines 48 to 50; figures 5 and 6]* with an annular scattering light detecting arrangement *[column 8, lines 48 to 52]* and a cylindrical turbidimeter vial (2) *[column 3, lines 18 to 21; column 7, lines 37 to 40]*, the vial (2) comprising:

a transparent vial body (2) comprising a transparent flat bottom inlet window *[see figure 6 showing on the left-hand side of the figure a flat surface of the vial (2) through which the light beam (5) enters the vial (2)]* and a transparent cylinder body (2) *[column 7, lines 37 to 40]* with a cylindrical outlet window axially aligned with the scattering light detecting arrangement so that the scattered light leaving the vial horizontally through the

outlet window is received by the annular scattering light detecting arrangement,

*[see figure 6; column 4, lines 45 to 57; column 8, lines 48 to 52: certain light rays, such as scattered light ray 5f is transmitted through a cylindrical portion of the vial body surrounding the line of focus (7), then reflected by surface (9b) of the solid annular meso-optic (1) towards the annular detector positioned adjacent to the planar annular optical surface (9c); the cylindrical portion of the vial body through which light rays such as light ray 5f are transmitted plays the role of the outlet window defined in claim 1]*

a separate cylindrical optical shielding (4) provided at the cylinder body (2) over a part of the axial length of the cylinder body (2) and axially adjacent to a non-shielded cylinder part serving as the outlet window, the shielding optically blocking the inside from the outside of the vial (2)

*[figure 6 shows layer (4) surrounding the bottom and the outlet window of the vial body (2); as disclosed in D8, column 5, lines 60 to 66, at the bottom of the vial (2), rays which are not internally reflected and would normally exit the vial body are prevented from leaving the vial body due to the presence of layer (4) having a radiation-blocking structure; the radiation-blocking structure (4) is axially adjacent to the non-shielded outlet window surrounding the line of focus (7); it is to be noted that layer (4) in figure 6 comprises a first portion at the left side which is shown dashed and a second portion at the right which is not dashed, thereby confirming that layer (4) has different functions at the bottom part and at the outlet window part of the vial].*

1.1.2 It follows that the subject-matter of claim 1 differs from the device of D8 in that an optical shielding is provided axially above the outlet window.

1.1.3 According to the application as filed, page 3, lines 20 to 24, the technical effect of this feature is to exclude "that the reflected light beam can directly irradiate any part of the light detecting arrangement".

1.1.4 According to the application as filed, the objective technical problem solved by the distinguishing feature is "to provide a nephelometric turbidimeter and in particular to provide a turbidimeter vial avoiding secondary signals" (see page 2, lines 25 and 26), wherein the secondary signals are due to light rays reflected inside the vial and exiting the vial.

1.1.5 Starting from the device of figures 5 and 6 of D8, the skilled person is naturally confronted with the problem that disturbing light rays are diffused or reflected back and forth within the vial body, in particular at the interface which exists between the fluid inside the vial body and the material surrounding the fluid. Some of this parasitic light emerges from the top portion of the vial body (2) and impinges on elements surrounding the vial body. Depending on the concrete circumstances, e.g. the concrete opto-mechanical arrangement of the turbidimeter or the light intensity of the measurement beam entering into the vial body for illuminating the particles to be measured, the parasitic light rays are reflected towards the optical detecting arrangement and disturb the measurement of the optical signal, generated by the particles in the fluid diffusing light at a very low intensity. The higher the intensity of the incident illumination beam and/or the lower the density of the diffusing particles in the fluid and, hence, the lower the

optical signal to be measured, the more this interference phenomenon negatively affects the accuracy of the measurements.

In order to avoid any disturbing light rays emerging from the vial body, it would be obvious for the skilled person to provide a layer (4) having a light-shielding portion not only at the bottom of the vial body but also at the top of the vial body, i.e. axially above the outlet window, thereby arriving at the claimed turbidimeter without exercising inventive skills.

1.2 Applicant's counter-arguments

1.2.1 The applicant argued that the skilled person would have no motivation to provide an optical shielding above the outlet window (see statement of grounds of appeal, points 4 and 6). As explicitly disclosed in D8, column 5, line 66 to column 6, line 3, "[r]ay 5g propagates beyond the annular optical arrangement through secondary optical structure 2 and does not contribute to the measurable optical signal of interest. Ray 5g does not generate optical noise and ray 5g is considered to be loss".

The board is not convinced by this argument. It is not because D8 discloses that ray 5g "does not generate optical noise" that this is generally true in any configuration of any turbidimeter. This statement in D8 has no general validity. It just means that in the specific configuration of D8, ray 5g was considered harmless. Actually, it is a matter of fact that light rays, such as ray 5g, can escape from the transparent part of the vial body at the top of the vial body due to diffusion or refraction at the interface between the vial body and the fluid in the vial. Furthermore, due to total internal reflection or due to partial reflection at the

interface between the fluid and the vial body, light is reflected back into the vial body, also contributing to parasitic light by being scattered again by the particles in the fluid. Depending on the ratio of the intensities of the escaped, and potentially disturbing, light rays and of the optical signal of interest, further depending on the concrete disposal of the detecting arrangement and of other elements surrounding the vial body, potentially also reflecting or diffusing the emerging light rays towards the detector, escaped light rays, such as ray 5g, may disturb the measurement of the signal of interest.

1.2.2 During oral proceedings, the applicant put forward that, according to the case law of the boards of appeal, it was not allowed to read the disclosure of the prior art as if the invention was known. This would amount to a forbidden ex post facto analysis. In particular, since D8 did not mention any optical noise due to escaped light rays, the board's reasoning was based on unallowable hindsight. According to the applicant, the technical background of the invention was the measurement of turbidity of drinking water, meaning that the density of unwanted particles scattering the incident light beam was low and, hence, the signal to be measured was low, too. In this case, the optical noise generated by even few parasitic light rays would be disturbing the signal measurement. The inventor recognised that optical shielding via a light-absorbing structure at the top of the vial body improved the accuracy of the measurement by eliminating the parasitic light rays. D8 did not deal with this type of situation.

The board is not convinced by the applicant's argument. As explained above, if the upper part of the vial body is left transparent, as disclosed in D8, light will naturally and necessarily escape from it, either directly by uncontrollable diffusion or refraction at the interface

between the fluid and the vial body, or indirectly after first being scattered back into the vial at the interface. D8, column 3, lines 43 to 46, discloses applying the turbidimeter for quantifying particulates in water. In this case, the signal to be measured is of very low intensity. Due to the light which inherently escapes from the vial body, the skilled person is automatically confronted with optical noise interfering with the measurement of the very low intensity and is looking for a solution. There is no need for hindsight to discover the existence of this problem. The claimed solution of providing an optical shield around the upper part of the vial body from which parasitic light escapes is considered to be obvious.

2. In view of the above, the applicant's request is not allowable and, therefore, there is no basis for setting aside the contested decision. Consequently, the appeal must be dismissed.

## Order

## For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Gabor R. Bekkering

Decision electronically authenticated