Patents Act 1977 **Opinion Number** **22/14**

OPINION UNDER SECTION 74A

Patent	EP 1196354 B1
Proprietor(s)	Tox Olaopa
Exclusive Licensee	
Requester	Tox Olaopa
Observer(s)	WABAG Wassertechnik AG and HGF Ltd.
Date Opinion issued	14 January 2015

The Request

1. The Comptroller has been requested to issue an opinion as to whether wastewater treatment plants incorporating the BIOPUR-DN[1] process would infringe EP 1196354 (the Patent). The Patent was granted on 23 August 2006 and remains in force in the UK.

2. Substantive observations were received from WABAG Wassertechnik AG (WABAG) and the requester filed observations in reply.

3. Separate observations were received from HGF Ltd on behalf of Aker Solutions to which further observations in reply were also received. These observations relate largely to whether Aker Solutions are liable for infringement and whether they should have been listed as an interested party. As none of this is relevant to the opinion I need to make I have not considered these observations and the corresponding observations in reply any further.

Infringement

4. Section 60 Patents Act 1977 (the Act) governs what constitutes infringement of a patent; Section 60(1) relates to direct infringement and Section 60(2) relates to indirect infringement. These sections of the Act read as follows:

> *(1) Subject to the provisions of this section, a person infringes a patent for an invention if, but only if, while the patent is in force, he does any of the following things in the United Kingdom in relation to the invention without the consent of*

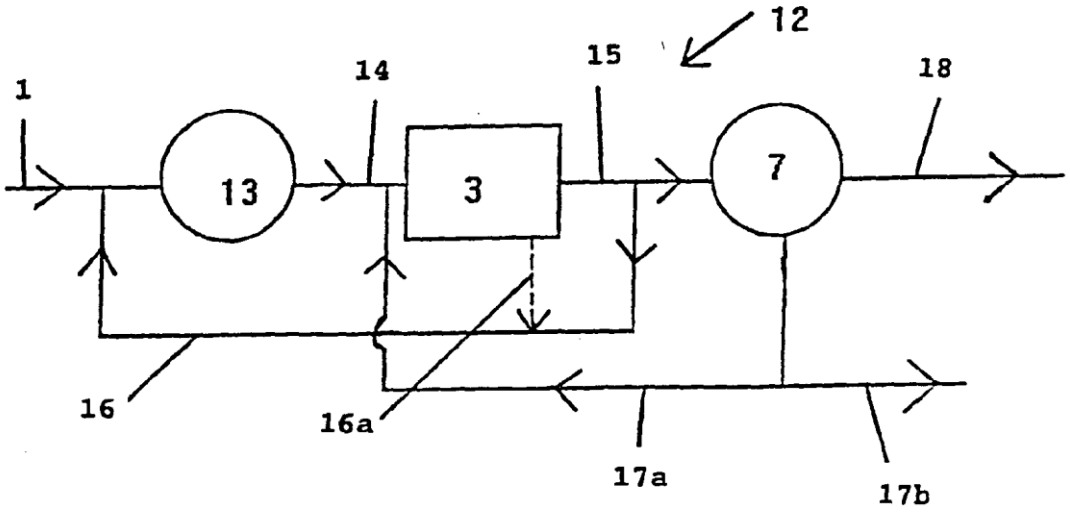
[1] Various trade marks were registered in the UK for BIOPUR, BIOPUR-DN, etc. for wastewater treatment but these are now expired. BIOPUR is a registered Swiss trade mark of WABAG AG.

the proprietor of the patent, that is to say -
(a) where the invention is a product, he makes, disposes of, offers to dispose of, uses or imports the product or keeps it whether for disposal or otherwise;
(b) where the invention is a process, he uses the process or he offers it for use in the United Kingdom when he knows, or it is obvious to a reasonable person in the circumstances, that its use there without the consent of the proprietor would be an infringement of the patent;
(c) where the invention is a process, he disposes of, offers to dispose of, uses or imports any product obtained directly by means of that process or keeps any such product whether for disposal or otherwise.

(2) Subject to the following provisions of the section, a person (other than the proprietor of the patent) also infringes a patent for an invention if, while the patent is in force and without the consent of the proprietor, he supplies of offers to supply in the United Kingdom a person other than a licensee or other person entitled to work the invention with any of the means, relating to an essential element of the invention, for putting the invention into effect when he knows, or it is obvious to a reasonable person in the circumstances, that those means are suitable for putting, and are intended to put, the invention into effect in the United Kingdom.

The Patent

5. The Patent relates to a process for treating wastewater comprising essentially three stages as illustrated in figure 1 below. The stages are a de-nitrification stage (13), a nitrification and oxidation stage (3), and a clarifying stage (7). The de-nitrification stage is carried out in a tank having both anoxic and anaerobic zones and a proportion of the effluent from the nitrification and oxidation stage is recycled (16) to the de-nitrification stage. This combination also serves to remove phosphorous.



6. **Figure 1 - Flow diagram for wastewater treatment process of the Patent (figure 2 of the Patent).**

7. The scope of the invention is defined by the claims. There is a single independent claim (claim 1) which reads as follows:

> 1. A biological process for the removal of nitrogen and phosphorous from municipal or industrial waste water, comprising a first reaction step in a tank (13) providing anoxic and anaerobic conditions, a reaction step in a separate tank (3) providing an aerobic condition for nitrification and oxidation of a liquor (14) received from said first reaction step, and a clarifying step, liquor from said separate tank being recycled back to said first tank (13),
>
> *characterised in that*
>
> said first tank (13) is a balancing tank or converted primary settlement tank providing an anoxic zone (1) around an entry point receiving an incoming flow of waste water and an anaerobic zone (B) in the surrounding area, that liquor (14) from said first tank (13) is conducted to said separate tank (3) for the aerobic reaction step at a controlled balanced feed rate, and that nitrified mixed liquor (15) is recirculated (16) from said separate tank (3) to said first tank (13).

8. The claims must be construed purposively following the well known House of Lords authority on claim construction *Kirin-Amgen v Hoechst Marion Roussel and others*[2]. This requires that I interpret the claims in the light of the description and drawings, to decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean.

9. The skilled person is considered to be a chemical engineer specialising in waste water treatment.

10. In general the claims are considered to be straightforward to construe. However, as will become apparent, the precise scope of some of the terms will need to be established.

BIOPUR-DN

11. The BIOPUR system is a biological wastewater treatment process based around the use of submerged biological fixed film filters with a packing, typically a structured packing or granular material, to support the biomass. The tanks that make up the system are configured in different ways depending on the particular part of the process. The system may be formed with tanks for nitrification (BIOPUR-N), de-nitrification (BIOPUR-DN), etc.

12. A lot of evidence has been supplied relating to the BIOPUR system to accompany the request. However, only a single figure illustrating a complete wastewater treatment process has been supplied. This is headed *"Prinzipschema Festbettbiologie"* on page 16 of section 5 ("Evidence") of the request. This part of the evidence comprises slides taken from a presentation as part of the 2012 Zurich Regional Wastewater Treatment Plant Staff Conference (Tagung ZH-Klaerwerkpersonal 2012) made by TBF + Partner AG. A copy of this figure with annotations in English is also provided in section 3 of the

[2] *Kirin-Amgen v Hoechst Marion Roussel and others* [2005] RPC 9.

request and is reproduced as figure 2 below:

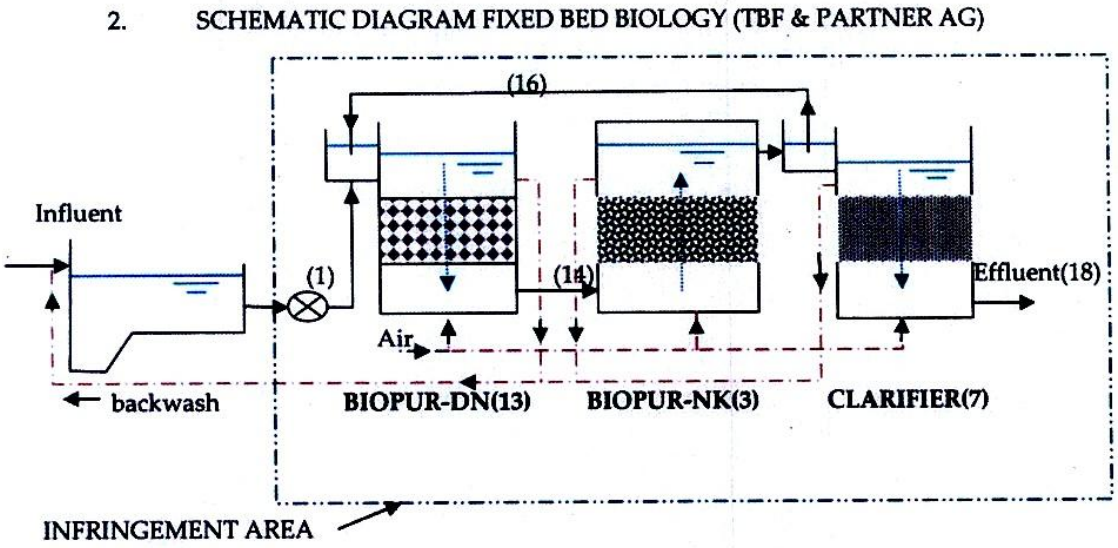


Figure 2 -Wastewater treatment process utilising BIOPUR (TBF & Partner AG)

13. The remainder of the evidence appears to describe the configuration of aspects of the system, in particular the nature of the Biopur-DN tank. The schematics of the BIOPUR tank as illustrated in the request (Section 5 – "Evidence") are reproduced below:

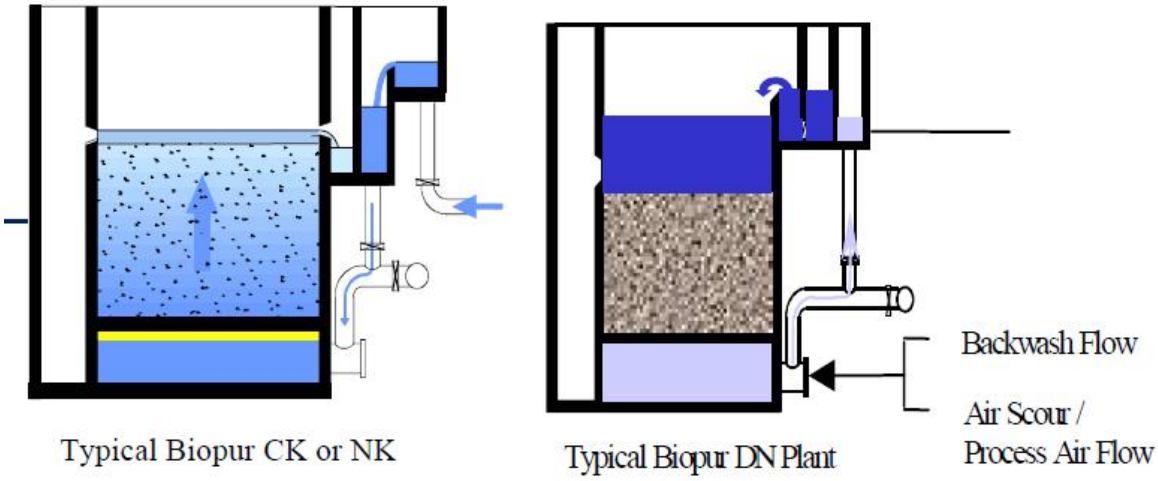


Figure 3 - BIOPUR schematics (AKER KVAERNER)

14. The arguments presented by the requester (Section 4 - "Arguments") include the following statements:

- *Specifically we want the UKIPO to declare that any use of a down-flow biological reactor ... for pre-denitrification infringes patent no. EP 1196354.*

- *We would also like UKIPO to declare that the use of any control device on*

the discharge pipework from the pre-denitrification tank infringes the patented process if it is used to support hydraulic head within the reactor.

- *Finally we want UKIPO to declare that any discharge pipework design from a down-flow biological reactor used for pre-denitrification based on "orifice principle" infringes the innovative steps of EP 1196354 as the control of hydraulic retention time in the patent is based on this principle.*

15. These statements all refer to pre-denitrification and therefore relate to the Biopur-DN tank. I consider these statements to be requests for an opinion on whether the BIOPUR-DN tank indirectly infringes the Patent by virtue of Section 60(2). I therefore need to consider whether or not this tank comprises *an essential element of the invention, for putting the invention into effect* and further, if necessary, whether or not *it is obvious to a reasonable person in the circumstances, that the BIOPUR-DN tank is suitable for putting, and is intended to put, the invention into effect.*

16. What constitutes an essential element of the invention has been considered by the court in *Nestec SA v Dualit Ltd*[3]. In that decision it was stated that an essential element must contribute to the implementation of the technical teaching of the invention and must not be of completely subordinate importance. I consider that, at the very least, in order to be an essential element on this basis, the BIPOUR-DN tank must have all the features of the first tank of claim 1, particularly those features found in the characterising part of claim 1.

Analysis

17. The characterising part of claim 1 specifically requires that the first tank is a balancing tank or converted primary settlement tank providing an anoxic zone and an anaerobic zone.

18. In their observations regarding this first tank, WABAG have identified that the BIOPUR-DN tank is a fixed bed reactor and that the BIOPUR tanks are aerated by passage of process air. Accordingly they state that the BIOPUR-DN tank is not a balancing tank or converted primary settlement tank and it does not have an anoxic or anaerobic zone.

19. In reply the requester argues that the fact that it is a fixed bed reactor is immaterial in relation to whether or not it is a balancing tank or converted primary settlement tank, and that de-nitrification requires anoxic conditions such that BIOPUR-DN is not normally aerated and the air inlets are only used during maintenance for air scouring of the packing media.

20. Taking this latter point first, I agree with the requester. The skilled person would understand that de-nitrification of wastewater requires anoxic conditions and the BIOPUR-DN tank would not be aerated under normal process conditions. The BIOPUR-DN tank would therefore have an anoxic zone and, at least when setup to provide effective de-nitrification, an anaerobic zone in the manner required by claim 1.

21. Looking in more detail at the arguments about whether the BIOPUR-DN tank is a

[3] *Nestec SA v Dualit Ltd* [2013] RPC 32.

balancing tank or converted primary settlement, WABAG have merely stated that:

> *"Accordingly, the first tank cannot be a balancing tank or converted primary settlement tank since a fixed bed is filled with "three dimensional support for the biological films".*

I am inclined to agree with the requester that whether or not the BIOPUR-DN tank is a fixed bed reactor is immaterial in deciding whether or not it is a balancing tank or a converted primary settlement tank. I therefore need to consider this further.

22. The requester's observations in reply refer to a *converted primary tank*. The suggestion appears to be that the BIOPUR-DN tank is a converted primary tank. The claim however refers specifically to a converted primary settlement tank. The various forms of settlement tanks would be well known to the skilled person and a primary settlement tank is a standard feature of many wastewater treatment processes. A brief description and illustration (see figure 4 below) of one such settlement tank is provided in the Patent (paragraph [0017]). Settlement tanks are generally characterised by having an inlet in an upper part of the tank surrounded by vertical baffles (19) to minimise disturbance to and mixing with the remainder of the tank, a liquid outlet (24) in an upper part of the tank to draw off clarified wastewater for further treatment and an outlet (22) for periodic removal of sludge (21) which accumulates in the bottom of the tank. On account of the description and illustration of such a settlement tank in the Patent, the skilled person would be in do doubt that, despite other references to a primary tank (e.g. paragraph [0020]), the reference to a primary settlement tank in the claims was deliberate and should be construed as such. Furthermore, although the nature of any conversion may be wide-ranging and only one example is provided in the patent, it is nevertheless quite clear that the BIOPUR-DN tank is not a converted primary settlement tank.

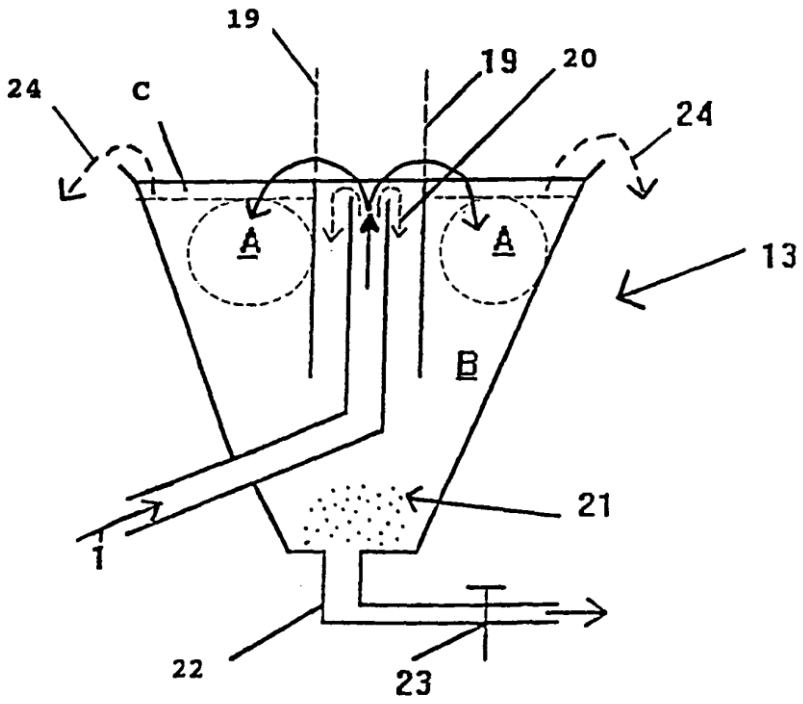


Figure 4 - Primary settlement tank (figure 4 of the Patent)

23. Having determined that the BIOPUR-DN tank is not a converted primary settlement tank, I must also consider whether or not it is a balancing tank. I consider that a balancing tank (also known as an equalisation tank) would be well known to the skilled person as a tank designed to balance a potentially widely varying inflow with a constant outflow demand. Balancing tanks also serve to balance out the composition of the inflow to generate a more consistent outflow composition. They are sized to accommodate periods when the inflow significantly exceeds the demanded outflow and also to provide a buffer reservoir when the outflow exceeds the inflow. Balancing tanks typically have a fixed rate pump at the outlet to provide a constant flow to the remainder of the treatment process. A primary settlement tank may also be configured to act as a balancing tank. The following definition of a balancing tank is taken from the Dictionary of Water and Waste Management[4]:

> ***Balancing tank, equalisation tank*** *- A tank designed to reduce and even out the variations in the flow or chemical characteristics prior to the wastewater treatment plant. The tank may store the wastewater or stormwater at high flows and release at low flows. Alternatively the tanks may be used in industry to balance out the variations in the nature of the wastewater that emanates from differing activities. This may occur prior to onsite treatment or discharge to a sewer. Many water and wastewater treatment processes operate most efficiently at a relatively constant flow...*

24. Paragraphs [0022] and [0023] of the Patent specify that the balancing tank of the invention is used to control a varying flow rate to provide a constant balanced flow rate to the aerobic reactor. In particular, paragraph [0022] starts by specifying that "*The balancing tank in the process according to the present invention will in general be used to balance incoming flows to a treatment works..."* Claim 1 also requires that *"liquor (14) from said first tank (13) is conducted to said separate tank (3) for the aerobic reaction step at a controlled **balanced** feed rate"*. Claim 7 further specifies that "*the dimensions of the balancing tank (13) are so selected ... to provide balancing of an incoming flow varying between 0.3 Dry Weather Flow and 3 Dry Weather Flow."* All these statements would be understood by the skilled person to be references to a conventional wastewater balancing tank for supplying a constant outflow irrespective of inflow and the term "balancing tank" as used in the claims would be construed accordingly.

25. I do not consider that the BIOPUR-DN tank is a balancing tank. The BIOPUR process is intended to be a continuous process (save for periodic back-washing) with each tank being substantially full such that the outflow from each tank is equal to the inflow. In the observations it is stated that *"the amount of liquid leaving the first tank (BIOPUR-DN) and flowing to the second tank (BIOPUR-NK) is always equal to the amount of liquid entering the tank".* The observations in reply (section 2) confirm this mode of operation as follows:

> *"The means of control from the BIOPUR-DN to the aerobic tank is to maintain a constant driving head or top water level in the anoxic tank...*
>
> *"What has been done with the BIOPUR-DN was to use a pump to feed tank (13)*

[4] "Dictionary of Water and Waste Management", Smith, P. G. & Scott J. G. Elsevier Butterworth-Heinemann, Oxford, 2nd Edition, 2005.

with constant flow, keep tank (13) flooded by raising the top water level on the outlet of [the aerobic] tank (3) to a level equivalent to desirable top water level in tank (13) minus head losses. The whole system is them made up of a continuous flow network discharging the same effluent flow as the influent."

This is not the mode of operation of a balancing tank.

26. Having made this statement in the observations in reply, the requester refers to the statement in paragraph [0025] of the patent which specifies that *"various alterations and modifications may be made to the above process without departing from the scope of the invention."* However, as the scope of the invention is defined by the claims and they require that the first tank is either a balancing tank or a converted primary settlement tank, the use of any other type of tank falls outside the scope of the Patent and would not infringe it.

27. There are a number of references in the request and observations in reply stating that the invention provides a controlled down-flow reactor to fix the hydraulic retention time. This statement does not appear to find support in the Patent, claim 1 of which requires that the first tank is controlled to provide a **balanced** feed rate to the aerobic tank. There is no mention in the Patent of hydraulic retention time.

28. I consider that the BIOPUR-DN tank is not a balancing tank or converted primary settlement tank as required by claim 1. As such the BIOPUR-DN tank is not an essential part of the invention and actions relating to it do not infringe the Patent by virtue of Section 60(2).

29. Similarly, the wastewater treatment process illustrated in figure 2 above, which includes a BIOPUR-DN tank, does not fall within the scope of claim 1 and there is therefore also no direct infringement by virtue of Section 60(1).

30. I have read and considered all the arguments and evidence supplied by the requester in the request and observations in reply. I can find nothing to persuade me that the BIOPUR-DN tank is a balancing tank or a converted primary settlement tank as required by the claims, or that these terms should be construed more broadly than I have set out.

Opinion

31. I do not consider that the BIOPUR-DN tank is a balancing tank or converted primary settlement tank as required by claim 1. Therefore, it is not an essential element of the invention. For the same reason, the wastewater treatment process illustrated in the request, which includes the BIOPUR-DN tank, does not fall within the scope of claim 1. Accordingly it is my opinion that any acts in relation to the BIOPUR-DN tank as referred to in the request do not constitute infringement of EP 1196354.

Application for review

32. Under section 74B and rule 98, the proprietor may, within three months of the date of issue of this opinion, apply to the comptroller for a review of the opinion.

Matthew Jefferson
Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.