

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL SEARCH REPORT**

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>P1967WO0-AQU</b>	<b>FOR FURTHER ACTION</b>	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. <b>PCT/AU2018/051066</b>	International filing date ( <i>day/month/year</i> ) 28 September 2018	(Earliest) Priority Date ( <i>day/month/year</i> ) 29 September 2017
Applicant <b>AQUATEC MAXCON PTY LTD</b>		
This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau. This international search report consists of a total of <b>7</b> sheets. <input type="checkbox"/> It is also accompanied by a copy of each prior art document cited in this report.		
<p>1. <b>Basis of the report</b></p> <p>a. With regard to the <b>language</b>, the international search was carried out on the basis of:</p> <p style="padding-left: 20px;"><input checked="" type="checkbox"/> The international application in the language in which it was filed.</p> <p style="padding-left: 20px;"><input type="checkbox"/> A translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).</p> <p>b. <input type="checkbox"/> This international search report has been established taking into account the <b>rectification of an obvious mistake</b> authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).</p> <p>c. <input type="checkbox"/> With regard to any <b>nucleotide and/or amino acid sequence</b> disclosed in the international application, see Box No. I.</p> <p>2. <input type="checkbox"/> <b>Certain claims were found unsearchable</b> (See Box No. II).</p> <p>3. <input checked="" type="checkbox"/> <b>Unity of invention is lacking</b> (See Box No. III).</p> <p>4. With regard to the <b>title</b>,</p> <p style="padding-left: 20px;"><input checked="" type="checkbox"/> the text is approved as submitted by the applicant.</p> <p style="padding-left: 20px;"><input type="checkbox"/> the text has been established by this Authority to read as follows:</p> <p>5. With regard to the <b>abstract</b>,</p> <p style="padding-left: 20px;"><input checked="" type="checkbox"/> the text is approved as submitted by the applicant.</p> <p style="padding-left: 20px;"><input type="checkbox"/> the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.</p> <p>6. With regard to the <b>drawings</b>,</p> <p>a. the figure of the <b>drawings</b> to be published with the abstract is Figure No. <b>4</b></p> <p style="padding-left: 20px;"><input checked="" type="checkbox"/> as suggested by the applicant.</p> <p style="padding-left: 20px;"><input type="checkbox"/> as selected by this Authority, because the applicant failed to suggest a figure.</p> <p style="padding-left: 20px;"><input type="checkbox"/> as selected by this Authority, because this figure better characterizes the invention.</p> <p>b. <input type="checkbox"/> none of the figures is to be published with the abstract.</p>		

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/AU2018/051066**

## A. CLASSIFICATION OF SUBJECT MATTER

**B01F 3/04 (2006.01) F16K 24/06 (2006.01) F16K 31/12 (2006.01) F16K 15/00 (2006.01)**

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Databases: PATENW, Espacenet, Auspat, Google Patents and Google

IPC/CPC: B01F3/04269, B01F3/04255, B01F2003/04354, F16L55/07, F16K24/06, C02F3/201, C02F3/208, Y10S261/70, B01D2313/04, F16K24/00, B01F2003/04304, B01F2003/04297, B01D63/00, B01D69/00, B01D2313/00, B01F3/04241, B01F3/04106, B01F2003/04276, B01F3/0412, F16K31/18, F16K33/00, Y10T137/7358, F16K15/14, F16K15/18, F16K15/00, C02F1/00 and similar

Keywords: diffuser, aerator, membrane, recess, sunken, depression, hollow, purge valves, two, series, float valve, check valve, tight, stretch, duck bill valve and similar

Applicant/Inventor: AQUATEC MAXCON PTY LTD, Gregory JOHNSTON, David Yule, Kenneth Roy WILDBUR

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search  
24 December 2018Date of mailing of the international search report  
24 December 2018

## Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE  
PO BOX 200, WODEN ACT 2606, AUSTRALIA  
Email address: pct@ipaaustralia.gov.au

## Authorised officer

Dominique Wisniewski  
AUSTRALIAN PATENT OFFICE  
(ISO 9001 Quality Certified Service)  
Telephone No. +61262850725

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2018/051066
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2537893 A (FLOWTHROUGH LTD) 02 November 2016 fig. 1c; fig. 4, 132, 136, 142, 152; fig. 8a, 530; page 5, lines 29-36; page 5, line 34 - page 6, line 6; page 6, lines 18-21, 34-38; page 7, lines 18-21	1-18, 20-24, 26-28, 29-32
Y	fig. 1c; fig. 4, 132, 136, 142, 152; fig. 8a, 530; page 5, lines 29-36; page 5, line 34 - page 6, line 6; page 6, lines 18-21, 34-38; page 7, lines 18-21	25
X	US 20040164433 A1 (JAGER) 26 August 2004 Paragraphs 1, 14, 21-22; fig. 1, 1, 2, 8, 11	1-5, 7-12, 14-17, 19-24, 26-28
Y	Paragraphs 1, 14, 21-22; fig. 1, 1, 2, 8, 11	25
X	CN 103118991 A (KUBOTA KK) 22 May 2013 Fig. 1; fig. 2, 2, 3; fig. 5a, 3; fig. 5b, 3; fig. 5c, 3; page 18, fifth paragraph	29-30, 32
X	US 6406005 B1 (LAWSON et al.) 18 June 2002 Column 1, lines 63-65; column 4, lines 17-18, 48-53; fig. 1, 1	29-30, 32
X	US 20170210652 A2 (FRANKEL et al.) 27 July 2017 Fig. 2; fig. 7, 210, 220; paragraph 30	29-30, 32
X	US 3736953 A (VAALBURG) 05 June 1973 Fig. 6, 10, 12, 14, 16, 28, 52, 56; column 1, line 66 - column 2, line 2; column 2, lines 36-43, 54-68	33-50
Y	Fig. 6, 10, 52; column 2, lines 36-39; column 2, lines 55-68	25
A	GB 1337110 A (PEGLERS LIMITED) 14 November 1973 page 2, lines 18-28	25, 33-50
A	CN 106870806 A (LIUZHOU JINGYANG ENERGY-SAVING TECH RES DEV CO LTD) 20 June 2017 fig. 1, 4 and 5; page 6, last paragraph- page 7, first paragraph	25, 33-50

**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:  
the subject matter listed in Rule 39 on which, under Article 17(2)(a)(i), an international search is not required to be carried out, including
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

**See Supplemental Box for Details**

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**Supplemental Box****Continuation of: Box III**

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups:

Group 1: claims 1-24 and 26-32 are directed to an elongate diffuser comprising a diffuser base and a membrane. The feature of the elongate diffuser comprising a diffuser base and a membrane is specific to this group of claims.

Group 2: claims 33-50 are directed to a purge valve system for use in an air inlet pipe of an air diffuser. The feature of the purge valve system is specific to this group of claims.

Claim 25 introduces features from group 2 and yet is additionally appended to claims in group 1.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

When there is no special technical feature common to all the claimed inventions there is no unity of invention.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only feature common to all of the claimed inventions is a diffuser. However it is considered that this feature is generic in this particular art.

Therefore this common feature cannot be a special technical feature. Hence there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied *a priori*.

It was considered that search and examination for the invention in group 2 would require more than negligible additional search and examination effort over that for the invention in group 1. An invitation to pay additional fees was issued, and all fees were paid by the applicant. Therefore all claims were searched and examined in this report.

This Authority has identified a further lack of unity within group 1 that separates claims 1-32 into distinct groups:

Group A: Claims 1-28 are directed to an elongate diffuser comprising a diffuser base comprising a diffuser body and a membrane, wherein the membrane is connected to the diffuser body so that introduction of gas at a working pressure into the diffuser displaces part of the membrane from contact with the diffuser body to provide an elongate sealed compartment between the membrane and a surface provided mainly or wholly by the diffuser body, and wherein a diffuser body surface which bounds the compartment comprises a recessed portion which is recessed away from the membrane. The feature of a diffuser body surface which bounds the compartment comprises a recessed portion which is recessed away from the membrane is specific to this group of claims.

Group B: Claims 29-32 are directed to a diffuser comprising a diffuser base and a membrane, where gas is introduced at a working pressure to flex the membrane and displace at least some of the membrane away from the base, to thereby form an interior compartment between the membrane and the base without substantial stretching of the membrane. The feature of the compartment forming without substantial stretching of the membrane is specific to this group of claims.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only feature common to all of the claimed inventions is a diffuser comprising a diffuser base comprising a diffuser body, a membrane attached to the diffuser body, wherein the membrane is connected to the diffuser body so that introduction of gas at a working pressure into the diffuser displaces part of the membrane from contact with the diffuser body to provide an elongate sealed compartment between the membrane and a surface provided mainly or wholly by the diffuser body. However this feature does not make a contribution over the prior art because it is disclosed in:

D1: GB 2537893 A (FLOWTHROUGH LTD) 02 November 2016 (fig. 4, 132, 136, 142, 152; fig. 8a, 530; page 5, lines 29-36; page 6, lines 34-38).

**Supplemental Box**

The above feature common to all the claims is also disclosed in D2-D5 (see "NOVELTY (N)" and "INVENTIVE STEP (IS)" in Box No. V).

Therefore in the light of this document this common feature cannot be a special technical feature. Therefore there is no special technical feature common to claims 1-32 and the requirements for unity of invention are consequently not satisfied *a posteriori*.

It was considered that search and examination for the invention in group B would require negligible additional search and examination effort over that for the invention in group A, and therefore all of claims 1-32 have been searched and examined in this report.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/AU2018/051066**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<b>Patent Document/s Cited in Search Report</b>		<b>Patent Family Member/s</b>	
<b>Publication Number</b>	<b>Publication Date</b>	<b>Publication Number</b>	<b>Publication Date</b>
GB 2537893 A	02 November 2016	GB 2537893 A	02 Nov 2016
US 20040164433 A1	26 August 2004	US 2004164433 A1	26 Aug 2004
		CN 1539763 A	27 Oct 2004
		DE 10305203 A1	19 Aug 2004
		EP 1447126 A2	18 Aug 2004
		MX PA04001126 A	05 Apr 2006
CN 103118991 A	22 May 2013	CN 103118991 A	22 May 2013
		CN 103118991 B	23 Sep 2015
		WO 2012108008 A1	16 Aug 2012
US 6406005 B1	18 June 2002	US 6406005 B1	18 Jun 2002
		AU 4935697 A	03 Jun 1998
		AU 745191 B2	14 Mar 2002
		CA 2273972 A1	22 May 1998
		EP 0946430 A1	06 Oct 1999
		EP 0946430 B1	02 Nov 2005
		JP 2001504754 A	10 Apr 2001
		JP 4723696 B2	13 Jul 2011
		WO 9821151 A1	22 May 1998
		US 20170210652 A2	27 July 2017
US 3736953 A	05 June 1973	US 3736953 A	05 Jun 1973
GB 1337110 A	14 November 1973	GB 1337110 A	14 Nov 1973
CN 106870806 A	20 June 2017	CN 106870806 A	20 Jun 2017

**End of Annex**

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

Form PCT/ISA/210 (Family Annex)(January 2015)