



No.331 ShiPin Road,Hsinchu City 30062,Taiwan,R.O.C.

TEL: (03) 5223191
FAX: (03) 5214016

Test Report

Applicant : Biotek Environmental Science Ltd.

Report NO. : 108SA00068

Address of applicant : 5F, 98 Xingde Road, Sanchung New Taipei City, Taiwan

Date Received : 2019/1/7

Name of Article : Ice Disinfection System

Completion date : 2019/05/20

Article Expiry Date :

Date Issued : 2019/07/04

Sample Description :

Items	Unit	Result	LOQ/LOD	Method
(1).Custom-designed program		As the attachment.(4 pages)		

Blank below



Authorized Representative: _____

NOTE

1.The results in this report are valid only to the sample sent by the applicant. Not to judge the legality of the product. 2.The results apply to the sample as received. If it is used for advertisement, sales promotion, or notarial use, please consult FIRDI first. 3.If there is any question about this test report, please contact this Institute, 886-3-5223191 ext257, 258, 259, 370. 4. 【non-detectable】 represents the result below the limit of quantification. 5.® : Accreditation item of TFDA. 6. 【Sample Description】 :The applicant's additional description of the sample, the applicant shall bear the relevant legal responsibility.

Report No. : 108SA00068

Applicant : Biotek Environmental Science Ltd.(BES Group)

Name of Article : Evaluation of Antimicrobial Efficacy of Ozonation Ice Making Machine with IDS (Ice Disinfection System) / BioSure Professional IDS (Model: EOS7170 Series)

Test Method : 1. AOAC 990.12 Aerobic Plate Count in Foods.
2. AOAC Official Method 991.14 Coliform and *Escherichia coli* Count in Foods.
3. Method of test for *Legionella pneumophila* in water, EPA method No. 0990094383, NIEA E238.51C.

Evaluation of Antimicrobial Efficacy of Ice Making Machine with IDS (Ice Disinfection System)

Test procedure :

1. Set up ice making machine that has been running properly for 4 months with IDS attached. Make sure the ice making machine and IDS unit both operate normally.
2. Prepare bacterial suspension of *Legionella pneumophila* subsp. *pneumophila* BCRC17854 at a concentration of 7.3×10^7 CFU/mL. Suspend 75mL of the bacterial suspension into 7500mL of water in the ice making machine. The final bacterial load of water in the ice making machine was 7.3×10^5 CFU/mL. Take water sample from the ice making machine and perform bacterial count immediately.
3. Perform tests for total aerobic count, *Escherichia coli* and *Legionella pneumophila* on the samples collected from the designated sampling site S1 (tank water at 1cm below the maximum water level) and S2 (ice freshly produced from the ice machine) for day 1, 30 and 90.

Results :

The ice making machine with IDS (Figure 1) was inoculated with bacterial suspension of *Legionella pneumophila* subsp. *pneumophila* BCRC17854 at a concentration of 7.3×10^5 CFU/mL and being operated continuously throughout the test period. Upon the duration of 1, 30 and 90 days was reached, samples were taken from the designated sampling site S1 (tank water at 1cm below the maximum water level) (Figure 2) and S2 (ice freshly produced from the ice machine) (Figure 3) and tested for total aerobic count, *Escherichia coli* and *Legionella pneumophila*. As shown in Table 1, test results for total aerobic count, *Escherichia coli* and *Legionella pneumophila* were negative. The antimicrobial efficacy was calculated as more than 99.999 %.



Conclusion :

Instant antimicrobial effects can be found once the IDS is attached to the ice making machine. Throughout the operation of IDS for 3 month in total, the antimicrobial efficacies of both the interior water supply and the ice produced by the ice making machine are maintained at more than 99.999%.

Table 1. Results of antimicrobial efficacy test for ice making machine with IDS after inoculation of *Legionella pneumophila* subsp. *pneumophila* BCRC17854 at a concentration of 7.3×10^5 CFU/mL.

Item	Day (code)	TPC (CFU/mL)	<i>E.coli</i> (CFU/mL)	<i>Legionella</i> <i>pneumophila</i> (CFU/mL)	Antimicrobial efficacy ⁽¹⁾ (%)
Tank water					
(bacterial load after the inoculation of <i>L. pneumophila</i>)	2019.1.29	—	—	7.3×10^5	-
IDS start-up					
S1 :	T _{D1}	—	—	Non-detectable	>99.999
S2 :	T _{D1}	—	—	Non-detectable	>99.999
Continuous operation of IDS for 30 days					
S1 :	T _{D30}	Non-detectable	Non-detectable	Non-detectable	>99.999
S2 :	T _{D30}	Non-detectable	Non-detectable	Non-detectable	>99.999
Continuous operation of IDS for 90 days					
S1 :	T _{D90}	Non-detectable	Non-detectable	Non-detectable	>99.999
S2 :	T _{D90}	Non-detectable	Non-detectable	Non-detectable	>99.999

Note : (1) Antimicrobial efficacy (%) = (initial inoculation – bacterial count with the operation of IDS) / initial inoculation x 100 %



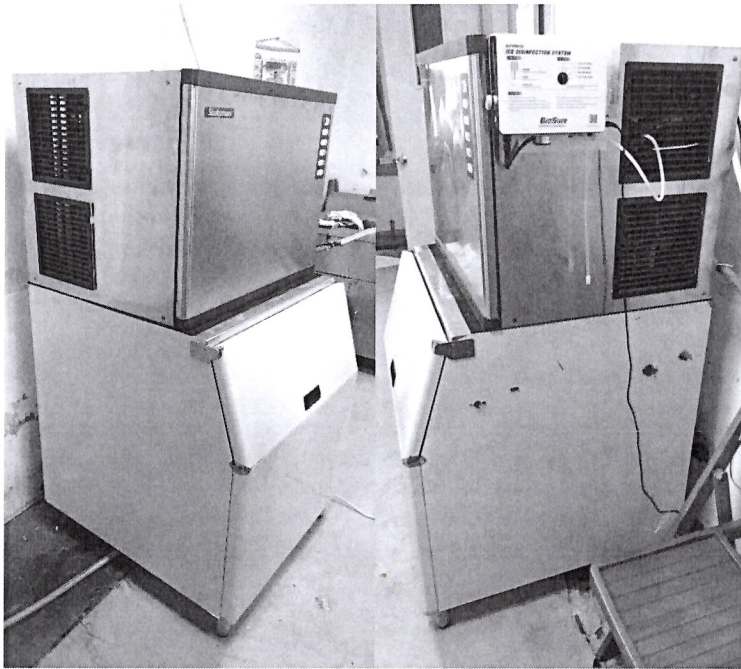


Figure 1. Ice making machine.

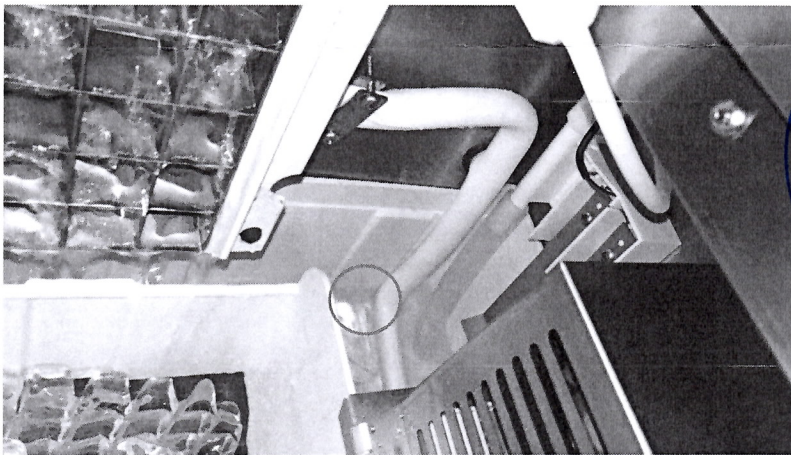


Figure 2. S1 is the tank water at 1 cm below the maximum water level.





Figure 3. S2 is the ice freshly produced from the ice machine.