dentair

GZ Institute of Microbiology

TEST REPORTS

All tests conducted with representative sample units

GZ INSTITUTE OF MICROBIOLOGY

Sterilization Rate

TEST REPORT

Test No.KJ20202504

GZ INSTITUTE OF MICROBIOLOGY

TEST REPORT

Date Received: Jul. 02, 2020
Date Analyzed: Jul. 02, 2020

Name of Sample	Air Purifier	Source of Sample	Delivery
Applicant	Bryant Medical LTD	Client	Chen Meifang
Manufacturer	——	Brand	dentair®
Type and Specification	FOZKYGB-03	Quantity of Sample	1PC
Date of Production	——	State of Sample	Machine
Batch Number	——	Packing of Sample	In box
Sample Picture			
Standard and Methods	1. <Technical Standard For Disinfection>2002-2.1.3 Air disinfection effect evaluation test 2. Referring to T/GIEHA 009-2018 The method for removing allergens of air cleaner		
Items of Analysis	1. Killing Rate (*Staphylococcus aureus* ATCC 6538, *Escherichia coli* 8099, *Klebsiella pneumoniae* ATCC 4352) 2. *Mite Antigen Removal Rate (*Dust mite Der f* 1)		
Remarks	——		

To be continued

GZ INSTITUTE OF MICROBIOLOGY

TEST REPORT

Date Received: Jul. 02, 2020
Date Analyzed: Jul. 02, 2020

Method for Testing Air Disinfection:

1. Test Equipments
   1) Test microorganism: *Staphylococcus aureus, Escherichia coli*, *Klebsiella pneumoniae*
   2) Microbial aerosol generator: TK-3
   3) Culture media: NA
   4) Sampling equipment: six-stage sieve sampler
2. Test Conditions
   1) The volume of the test chamber: 30 m^3
   2) Environment temperature: (20~25) °C
   3) Environment humidity: (50~70) % RH
3. Operation Conditions of the Machine
   Set the switch to position "The highest gear".
4. Test Procedures
   1) Get a bacteria slant culture (4~5 generation) which is incubated at 37 °C for 24 h, wash the culture from this slant with 10 mL NB, filter the liquid culture by aseptic cotton buds, and dilute this inoculums with NB as appropriate.
   2) The equipments are placed in the test chambers respectively, close the door, and open the HEPA filter. Simultaneously operate the environmental control devices until the experimental cabin temperature to be (20~25)°C , relative humidity to be (50~70)%RH, Turn off the chamber environmental control system.
   3) Release microbial aerosol: turn on the microbial aerosol generator, then turn on the ceiling fan, turn off the fan after 5 min, and let stand for 5 min.
   4) Original bacteria aerosols collected by six-stage sieve sampler.
   5) The test group started the air purifier and sampled after 60 min of action, and the control group also sampled in the corresponding time period.
   6) Choose 2 NA plates (the same batch) as the negative control, and culture them on the same condition with the samples.
   7) Run the test three times.
5. Computational Formula

Natural decay rate $N_t(\%) = \frac{V_0 - V_t}{V_0} \times 100$

Where: V_0 = Original Bacteria Count of Control group; V_t = Bacteria Count after Treatment of Control group .

Killing Rate $K_t(\%) = \frac{V_1 \times (1 - N_t) - V_2}{V_1 \times (1 - N_t)} \times 100$

Where: V_1 = Original Bacteria Count of test group; V_2 = Bacteria Count after Treatment of test group.

To be continued

GZ INSTITUTE OF MICROBIOLOGY

TEST REPORT

Date Received: Jul. 02, 2020
Date Analyzed: Jul. 02, 2020

Test results

Number of Sample	Test Time (min)	Test Bacteria	Test Number	Control Group			Test Group		Killing Rate K_t (%)
				Original Bacteria Count V_0 (cfu/m^3)	Bacteria Count after Treatment V_t (cfu/m^3)	Natural Decay Rate N_t (%)	Original Bacteria Count V_1 (cfu/m^3)	Bacteria Count after Treatment V_2 (cfu/m^3)	
KJ20202504-1	60	*Staphylococcus aureus*	1	1.22×10^5	9.68×10^4	20.66	1.36×10^5	7	99.99
			2	1.27×10^5	1.03×10^5	18.90	1.34×10^5	7	99.99
			3	1.39×10^5	1.11×10^5	20.14	1.45×10^5	7	99.99
		Escherichia coli	1	1.19×10^5	7.99×10^4	32.86	1.25×10^5	7	99.99
			2	1.14×10^5	7.52×10^4	34.04	1.10×10^5	7	99.99
			3	1.30×10^5	8.86×10^4	31.85	1.41×10^5	7	99.99
		Klebsiella pneumoniae	1	1.24×10^5	9.06×10^4	26.94	1.20×10^5	7	99.99
			2	1.17×10^5	8.35×10^4	28.63	1.33×10^5	7	99.99
			3	1.08×10^5	7.87×10^4	27.13	1.29×10^5	7	99.99

Note: The negative control group was sterile growth.

To be continued

TESTING
CNAS L0823

201719001121

GZ INSTITUTE OF MICROBIOLOGY

Clean Air Delivery

TEST REPORT

GZ INSTITUTE OF MICROBIOLOGY

TEST REPORT

Date Received: Feb. 11, 2020
Date Analyzed: Feb. 13, 2020

Method for Testing Clean Air Delivery Rate of Gaseous Pollutant:

1. Testing Condition
   1) Environment temperature: (25±2) ℃
   2) Environment humidity: (50±10) %RH.
2. Testing Equipment
   Test chamber (30 m^3), constant current atmospheric sampler, gas chromatograph, VOC analyzer.
3. Running State of the Machine
   Set the switch to position "the highest grade".
4. Test Procedure
   1) Place the air purifier into the chamber according to the standard's requirements. Set the air purifier to the particular running state. Make sure the air purifier runs normally, and then turn off the air purifier.
   2) Purify the air in the chamber using the HEPA filter. Make sure the background concentration of the pollutants reaches a particular level, and then turn on the temperature and humidity control device. Keep the temperature and humidity control device running until the temperature and the humidity reaches the standard's requirement.
   3) A certain amount of gaseous pollutant is added into the chamber using the gaseous pollutant generator. Turn off the gaseous pollutant generator while concentration of the pollutants reaches the standard's requirement.
   4) Mix the gaseous pollutant for 10 min, and then turn off the ceiling mixing fan.
   5) Sample the initial concentration after the fan is stopped.
   6) Turn on the air purifier. Collect samples at 5-minute intervals for 60 minutes.
   7) According to the step 1) ~ 6), test the natural decay without the air purifier.
   8) The CADR should be tested in the same way for 3 times, and between every tests the air purifier should be idled for more than 24 h. The last test should be used for the calculation of CADR final result.

   Note 1. Before the test, the air purifier has been running for more than 1 h.
   Note 2. The data less than the requirement of GB/T 18883 is invalid.
   Note 3. If the valid data points are less than six, Crossed sampling can be used.
5. Computational Formula

$$CADR\ (m^3/h) = 60 \times (k_e - k_n) \times V$$

Where: k_e = total decay constant; k_n = natural decay constant; V = volume of the test chamber, m^3

Test Results

Number of Sample	Pollutant	Natural Decay Constant k_n (min^{-1})	Total Decay Constant k_e (min^{-1})	CADR (m^3/h)
KY20200045-1	TVOC	0.0007	0.0343	60.5

To be continued

TESTING
CNAS L0823

201719001121

Test No. KY20200045

GZ INSTITUTE OF MICROBIOLOGY

TEST REPORT

Date Received: Feb. 11, 2020
Date Analyzed: Feb. 13, 2020

Method for Testing Gaseous Pollutant Removal:

1. Test Conditions
   1) Environment temperature: (25±2) ℃
   2) Environment humidity: (50±10) %RH.
2. Test Equipment
   Test chamber (30 m^3), Compound gas detector.
3. Operation Conditions of the Machine
   Set the switch to position "the highest grade".
4. Test Procedure
   1) Place the air cleaner to be tested in the chamber according to the requirements of standard and set the air cleaner controls to the conditions for test. Test for proper operation, then shut off with switch external to test chamber.
   2) Using the chamber HEPA filter, allow the test chamber air to clean until the background pollutants reaches a level. Simultaneously operate the environment control devices until the room conditions (temperature and RH) reach a specified state. Turn off the chamber environmental control system (HEPA filter and humidifiers).
   3) A certain amount of gaseous pollutant is added into the chamber using the gaseous pollutant generator. After the initial concentration reaches the requirements of standards, close the generator.
   4) Mix the gaseous pollutant for 10 min, then turn off ceiling mixing fan.
   5) Wait for fan to stop, the initial concentration of sample is gathered.
   6) Turn on air cleaner. The sample is collected after 60 min.
   7) According to the step 1) ~ 6), test the natural decay without the air purifier.
5. Computational Formula

Natural decay rate $N_t'(\%)=\frac{C_0'-C_t'}{C_0'}\times 100$

where: C_0' = the original concentration of control group; C_t' = the final concentration of control group

Total decay rate $N_t(\%)=\frac{C_0-C_t}{C_0}\times 100$

where: C_0 = the original concentration of test group; C_t = the final concentration of test group

Removal rate $K_t(\%)=\frac{C_0\times(1-N_t')-C_t}{C_0\times(1-N_t')}\times 100$

Test Results

Number of Sample	Pollutant	Test Time (min)	Control Group		Test Group		Removal Rate K_t (%)
			Concentration C' (mg/m^3)	Natural Decay Rate N_t' (%)	Concentration C (mg/m^3)	Total Decay Rate N_t (%)	
KY20200045-1	Methyl mercaptan	0	1.03	——	1.07	——	——
		60	0.99	3.9	0.07	93.5	93.2

End of report

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GZ INSTITUTE OF MICROBIOLOGY

Mite Allergen

TEST REPORT

GZ INSTITUTE OF MICROBIOLOGY

TEST REPORT

Date Received: Jul. 02, 2020
Date Analyzed: Jul. 02, 2020

Test Method for Removing Mite Allergen:

1. Test Equipment
   Liquid impactor sampler, Centrifuge, Aerosol generator, Microtiter plate reader capable, etc.
2. Test Conditions
   1) The volume of the test chamber: 30m^3
   2) Environment temperature: (20~24)
   3) Environment humidity: (40~60) %RH
3. Operational Conditions of the Machine
   Set the switch to position “The highest gear”.
4. Test Procedure
   1) Place the air cleaner to be tested in the test chamber in accordance with standard request and set the air cleaner controls to the conditions for test. Test for proper operation, then turn off the air cleaner.
   2) Using the test chamber HEPA filter, allow the test chamber air to clean until the background concentration in the size range of 0.3 μm to 10 μm reaches a concentration of less than 1000 particles/L. Simultaneously operate the environmental control devices until the test chamber conditions have reached the requirements.
   3) When an acceptable test chamber background concentration is achieved record the background concentration, turn off the test chamber environmental control system.
   4) Connect the aerosol generator and atomize the prepared allergen solution into the test chamber until the initial concentration of the test reaches the requirements.
   5) Connect the liquid impactor sampler to collect the atomized allergen aerosol, which is taken as the initial concentration of the tes.
   6) After the initial concentration is determined, open the sample to be tested and operate for 60min. Then collect the concentration of allergens in the cabin with the liquid impactor sampler again.
   7) Don’t turn on the sample, repeat the steps 1-6) to do blank control and test natural attenuation.
   8) Double antibody sandwich ELISA was used to detect the content of allergen Der f1 in the samples.
5. Computational Formula

Natural decay rate: $N_t(\%)=\frac{C_0^{'} \quad C_t^{'}}{C_0^{'}} \quad 100$

Where: $C_0^{'}$ = original Der f 1 count of control group; $C_t^{'}$ = Der f 1 count after treatment of control group.

Killing Rate: $K_t(\%) \quad \frac{C_0 \quad (1 \quad N_t) \quad C_t}{C_0 \quad (1 \quad N_t)} \quad 100$

Where: C_0 = original Der f 1 count of test group; C_t = Der f 1 count after treatment of test group.

Test Results

Number of Sample	Mite Allergen	Test Time (min)	Control Group			Test Group		Removal rate K_t (%)
			Original Count C'_0 (ng/m^3)	Count after Treatment C'_t (ng/m^3)	Natural Decay Rate N_t (%)	Original Count C_0 (ng/m^3)	Count after Treatment C_t (ng/m^3)	
KJ20202504-1	Der f1	60	1018	940	7.66	1077	15	98.49

End of report

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2015191101Z

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CADR

TEST REPORT

CNAS L0823 2015191101Z

Test No. KJ20160928

GZ INSTITUTE OF MICROBIOLOGY

REPORT FOR ANALYSIS

Date Received: September 19, 2016
Date Analyzed: September 20, 2016

Method for testing gaseous pollutant removal:

1. Test conditions
   1) Environment temperature: (25±2) ℃
   2) Environment humidity: (50±10) %RH.
2. Test equipment
   Test chamber (30 m^3), constant current atmospheric sampler, UV-VIS spectrophotometer.
3. Operation conditions of the machine
   Set the switch to position "the highest wind speed".
4. Test procedures
   1) Place the air cleaner to be tested in the chamber according to the requirements of standard and set the air cleaner controls to the conditions for test. Test for proper operation, then shut off with switch external to test chamber.
   2) Using the chamber HEPA filter, allow the test chamber air to clean until the background pollutants reaches a level. Simultaneously operate the environment control devices until the room conditions (temperature and RH) reach a specified state. Turn off the chamber environmental control system (HEPA filter and humidifiers).
   3) A certain amount of gaseous pollutant is added into the chamber using the gaseous pollutant generator. After the initial concentration reaches the requirements of standards, close the generator.
   4) Mix the gaseous pollutant for 10 min, then turn off ceiling mixing fan.
   5) Wait for fan to stop, the initial concentration of sample is gathered.
   6) Turn on air cleaner. Collect samples at 3-minute intervals for 60 minutes.
   7) According to the step 1) ~ 6), turn off air cleaner, test the natural decay.
   8) Air cleaner should let stand for at least 24 h between two tests, CADR of the third test as the final result.
   Note 1. Before the test, the air cleaner is to commissioning at least 1 h.
   Note 2. The sample concentration under the limit value of national standard GB/T 18883 or other relevant regulations should be invalid.
   Note 3. If the valid data points less than six, porous cross of sampling can be used.
5. Computational formula

$$CADR\ (m^3/h) = 60 \times (k_e - k_n) \times V$$

Where: k_e = total decay constant; k_n = total decay constant; V = volume of the test chamber, m^3

Test Results

Number of Sample	Pollutant	Natural decay constant k_n (min^{-1})	Total decay constant k_e (min^{-1})	CADR (m^3/h)
KJ20160928-1	Formaldehyde	0.0010	0.1108	197.6

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Test No. KJ20160928

GZ INSTITUTE OF MICROBIOLOGY

REPORT FOR ANALYSIS

Date Received: September 19, 2016
Date Analyzed: September 20, 2016

Method for Measuring Clean Air Delivery Rate of Particulate:

1. Test object
   Particulate (≥0.3μm)
2. Test conditions
   1) Environment temperature: (25 ± 2)℃
   2) Environment humidity: (50±10)% RH
3. Test equipments
   Test chamber (30 m^3), Laser dust particle counter, Dilutors
4. Operation conditions of the machine
   Set the switch to position "The highest wind speed".
5. Test procedures
   1) Place the air cleaner to be tested in the test chamber in accordance with standard request and set the air cleaner controls to the conditions for test. Test for proper operation, then turn off the air cleaner.
   2) Using the test chamber HEPA filter, allow the test chamber air to clean until the background concentration in the size range of 0.3μm to 10μm reaches a concentration of less than 1000 particles/L. Simultaneously operate the environmental control devices until the test chamber conditions.
   3) When an acceptable test chamber background concentration is achieved record the background concentration, turn off the test chamber environmental control system.
   4) Immediately light, then place one standard cigarette in the cigarette smoke generator, seal generator, open valve to chamber, to provide the required initial concentration($2\times10^6 \sim 2\times10^7$ particles/L).Turn off air supply and close test chamber valve. Mix cigarette smoke for ten minutes after the initial concentration has been reached.
   5) Turning off ceiling mixing fan, begin to acquire the cigarette smoke particulate concentration. This test point is the initial concentration (C_0).
   6) Open the air cleaner and start the test as soon as the initial concentration of particulate matter is completed. Collect samples at two-minute intervals for 20 minutes.
   7) Test the natural decay according to the steps 1）～6）, except that the air cleaner is unoperated.
6. Computational formula
   CADR $Q\ (m^3/h) = 60\times(k_e - k_n)\times V$
   Where: k_e = total decay constant; k_n = natural decay constant; V = volume of the test chamber, m^3

Test Results

Number of Sample	Pollutant	Natural decay constant k_n (min^{-1})	Total decay constant k_e (min^{-1})	CADR Q (m^3/h)
KJ20160928-1	Particulate	0.0027	0.3834	685.3

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Test No. KJ20160928

GZ INSTITUTE OF MICROBIOLOGY

REPORT FOR ANALYSIS

Date Received: September 19, 2016
Date Analyzed: September 20, 2016

Method forTesting Air Disinfection:

1. Test equipments
   1) Test microorganism: *Staphylococcus albus*
   2) Microbial aerosol generator: PLG 2000
   3) Culture media: NA
   4) Sampling equipment: six-stage sieve sampler
2. Test conditions
   1) The volume of the test chamber: 30 m^3
   2) Environment temperature: (20~25) ℃
   3) Environment humidity: (50~70) % RH
3. Operation conditions of the machine
   Set the switch to position "The highest wind speed".
4. Test procedures
   1) Get a Bacteria slant culture (4~7 generation) which is incubated at 37 ℃ for 24 h, wash the culture from this slant with 10 mL NB, filter the liquid culture by aseptic cotton buds, and dilute this inoculums with NB as appropriate.
   2) The equipments are placed in the test chambers respectively, close the door, and open the HEPA filter. Simultaneously operate the environmental control devices until the experimental cabin temperature to be 20~25 ℃, relative humidity to be 50~70 %RH. Turn off the chamber environmental control system.
   3) Release microbial aerosol: turn on the microbial aerosol generator, release the microbial aerosol 15~20 min at 0.2 MPa, operate the ceiling mixing fan, then turn off the fan after 10 min, and let stand for 15 min.
   4) Original Bacteria aerosols collected by six-stage sieve sampler.
   5) The air cleaner are adjusted to the highest air cleaning mode setting for test (test group), Bacteria aerosols (control group and test group) are collected at 1 h respectively.
   6) Choose 2 NA plates (the same batch) as the negative control, and culture them on the same condition with the samples.
   7) Run the test three times and take the mean as the final result.
5. Computational formula

   Natural Decay Rate $N_t(\%)=\frac{V_0-V_t}{V_0}\times 100$

   Where: V_0 = Original Bacteria Count of Control Group; V_t = Bacteria Count after Treatment of Control Group .

   Killing Rate $K_t(\%)=\frac{V_1\times(1-N_t)-V_2}{V_1\times(1-N_t)}\times 100$

   Where: V_1 = Original Bacteria Count of Test Group; V_2 = Bacteria Count after Treatment of Test Group.

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2015191101Z

Test No. KJ20160928

GZ INSTITUTE OF MICROBIOLOGY

REPORT FOR ANALYSIS

Date Received: September 19, 2016
Date Analyzed: September 20, 2016

Test results

Number of Sample	Test Bacteria	Test Time (h)	Test Number	Control Group: Original Bacteria Count V_0 (cfu/m^3)	Control Group: Bacteria Count after Treatment V_t (cfu/m^3)	Control Group: Natural Decay Rate N_t (%)	Test Group: Original Bacteria Count V_1 (cfu/m^3)	Test Group: Bacteria Count after Treatment V_2 (cfu/m^3)	Killing Rate K_t (%)
KJ20160928-1	*Staphylococcus albus*	1	1	1.15×10^5	9.00×10^4	21.74	1.16×10^5	7	99.99
			2	1.08×10^5	8.32×10^4	22.96	1.12×10^5	7	99.99
			3	1.36×10^5	1.06×10^5	22.06	1.33×10^5	7	99.99
			Mean						99.99

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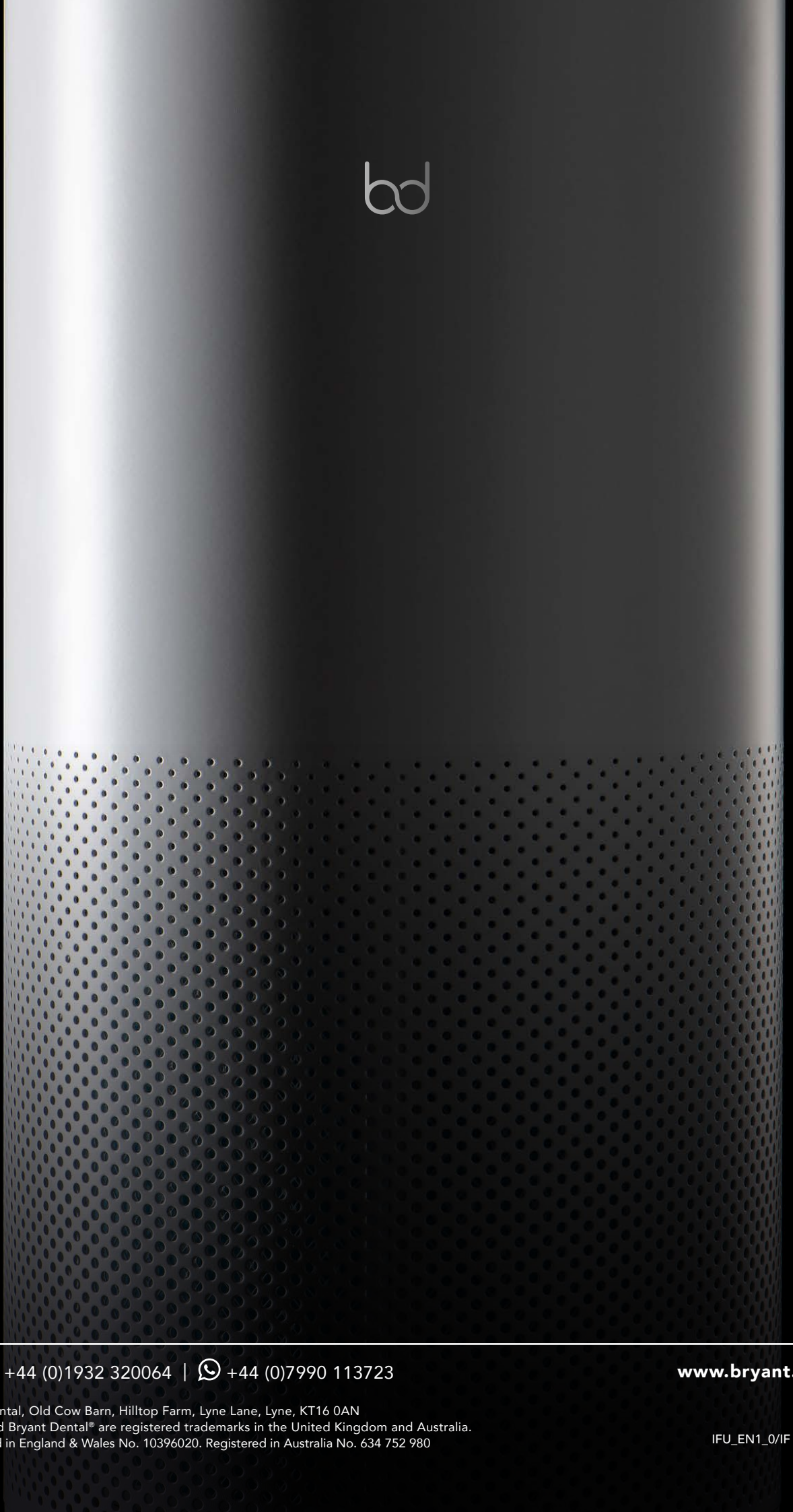

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