The Commercial Kitchen Filtration Experts

Specification & Defra Report

Project:	Gail's Bakery, Swains Lane
Prepared for:	Climate Control
Prepared by:	Andrew James
Date:	22nd September 2017

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Interpretation of Requirements

Following our conversation today I am pleased to provide an equipment selection for an odour control solution.

As with any project we get involved in we always recommend to our clients that they should closely follow the DEFRA guide for guidance on odour control equipment selection.
This ensures that what they propose will be in line with local authority's requirements and if the system is maintained correctly they will not exhaust nuisance odours leading to complaints from nearby residents.

With this in mind I carried out a risk assessment as detailed in Annex C of the DEFRA Guide.
Taking into consideration the level of discharge, proximity of receptors, size of kitchen and cooking type your project requires a high level of odour control to comply.

We have scored as below and as taken from Annex C: Risk Assessment for Odour;

Dispersion = 15
Proximity of receptors = 10
Size of kitchen = 3
Cooking type = 1
Total score = 29

The type of odour abatement system that complies is as below, taken directly from the DEFRA Guide and must be to a high level of control;

Odour arrestment plant performance

High level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.2 – 0.4 residence time).
2. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	more than 35

* based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

Criteria	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into courtyard or restriction on stack.
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s.
	Moderate	10	Discharging 1m above eaves at 10 -15 m/s.
	Good	5	Discharging 1m above ridge at 15 m/s.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge.
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge.
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge.
Size of kitchen	Large	5	More than 100 covers or large sized take away.
	Medium	3	Between 30 and 100 covers or medium sized take away.
	Small	1	Less than 30 covers or small take away.
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips.
	High	7	Kebab, Vietnamese, Thai or Indian.
	Medium	4	Cantonese, Japanese or Chinese.
	Low	1	Most pubs, Italian, French, Pizza or steakhouse.

The System

The first stage of control should be our Electrostatic Precipitator ESP3000 unit.

As our ESP's have been specifically designed for kitchen extract and not modified from industrial use, they have integral sumps to collect the oil, grease and smoke particles filtered out of the exhaust; this not only simplifies servicing but eradicates potentially dangerous spillage from the bottom of the units and greatly cuts down on flammable build-ups within the duct run.

The ionisation voltage has been designed to run at a negative potential which enhances the ionisation of particles and also produces more Ozone which is helpful in reducing odours in kitchen applications.

Our ESP units fit in-line with the kitchen ducting and can be configured modularly to cope with all extract volume requirements.

The Electrostatic Precipitator is a very efficient means for separating the particulate phase; operating efficiency when clean can be as high as 98% at particle sizes down to 0.01 micron.

The Electrostatic Precipitator does not present a high-pressure loss (175PA approx. dependant on air flow). This gives a specific advantage in that most standard Kitchen extractor fans will have the capability of overcoming this small differential.
This is particularly advantageous when it is considered that if the pressure loss were high larger noisier fans would probably be necessary resulting in potential noise pollution.

Carbon Filters

The second stage of control should be our Site Safe Carbon Filters, these innovative carbon units measure 594x196x597mm, three combining to 594x594x597mm, directly replacing our original carbon blocks whilst providing exactly the same filter performance as an existing full size cell.

Their advantage is that they only weigh 18kg each against the 68kg of our original blocks. This takes the strain out of fitting and servicing, allowing only one engineer to complete the task where two had been previously required.

Our Site Safe Carbon Filters use panels of activated carbon to remove the malodourous gases within the commercial kitchen extract duct through the process of chemical adsorption. By installing our ESP units before our carbon filters, the carbon life span is greatly increased, allowing it to nullify malodours at optimum efficiency for much longer.

They have been sized to achieve a 0.55s dwell time.
This site requires a high level of control to comply with DEFRA, which means carbon filters should be fitted with a 0.2 to 0.4s dwell time.

Therefore we have exceeded DEFRA requirements.

Specification

1 No. ESP 1500E Unit.

Specification per unit

Air Volume Max*	0.7m³/s
Electrical Supply	220/240V 50Hz 1ph
Power Consumption	30 W
Weight each	55kg
Min/Max Working Temperature	4/56°C
Max Relative Humidity	75%

12No. 594 x 196 x 597 Site Safe Carbon Filters complete with side access casing to be installed by others.

purified air® since 1984

BESA BUILDING ENGINEERING SERVICES ASSOCIATION

TÜV NORD TÜV UK Ltd. ISO 9001 UKAS MANAGEMENT SYSTEMS 065

FETA

CESA CATERING EQUIPMENT SUPPLIERS' ASSOCIATION

RBA ACOUSTICS

GAIL'S BAKERY
21 SWAINS LANE
HIGHGATE
LONDON N6 6QX

Plant Noise

Assessment

REPORT 8175/PNA
Prepared: 18 October 2017
Revision Number: 3

Gail's Ltd.
75 Salusbury Road
London
NW6 6NH

Plant Noise Assessment

GAIL'S BAKERY
21 SWAINS LANE HIGHGATE
LONDON N6 6QX

REPORT 8175/PNA
Prepared: 18 October 2017

Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	17 August 2017	David Johnston	Paul Taylor
1	Criteria updated	30 August 2017	David Johnston	Paul Taylor
2	New plant selected	10 October 2017	David Johnston	Paul Taylor
3	Additional plant assessed	18 October 2017	David Johnston	Paul Taylor

Terms of contract:

RBA Acoustics Ltd has prepared this report in accordance with our Scope of Work 8175/DJ dated 21 July 2017. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and again will need to be developed in to full working drawings by the lead designer to incorporate all other design disciplines.

In line with our Environmental Policy, up to two hard copies of the report will be provided upon request. Additional copies of the report, or further hard copies of revised reports, would be subject to an administrative cost of £20.00 (+VAT) per copy.

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1.0 INTRODUCTION

RBA Acoustics have been commissioned to assess the potential impact of noise from items of fixed mechanical plant serving Gail's Bakery at 21 Swain's Lane, Highgate, London N6 6QX. The bakery is to be served by a kitchen extract canopy which will be ducted to the rear of the premises and terminate above a flat roof at first floor level.

A noise survey was carried out at the site by Sharps Redmore Acoustic Consultants prior to the bakery beginning trading. Since then other neighbouring commercial premises have been granted planning permission for items of mechanical plant and have begun trading. RBA Acoustics have been commissioned to assess the impact of the proposed plant serving Gail's in accordance with the London Borough of Camden's noise policy.

Revision 3 of this report includes the assessment of the existing ventilation fan and toilet extract fan.

2.0 CRITERIA

2.1 Local Authority Requirements

The London Borough of Camden's planning requirements in terms of noise are outlined in the Camden Local Plan (June 2017). For industrial and commercial noise sources the guidance states that a *"Level of 10dB below background (15dB if tonal components are present) should be considered as the design criterion"*. For smaller items of plant (e.g. condensers and extract ventilation) a specification of NR35dB or below as measured 1 meter from the façade of affected premises is also required.

2.2 Previous Reports

A noise assessment was originally carried out at the site by Sharps Redmore Acoustic Consultants in support of the planning application (report ref R1-15.7.15-Swains Lane-1515401-GJK, dated 15 July 2015).

The representative background sound level ($L_{A90,15minute}$) as measured by Sharps Redmore is 44dBA, measured on a Sunday morning when noise levels can reasonably be expected to be at their lowest within the proposed operational hours.

2.3 Summary

In line with the above requirements we would propose items of mechanical services be designed so that noise emissions from the plant do not exceed the following noise rating level when assessed at the nearest noise sensitive location:

- Operational Hours (07:00 – 20:00) 34 dBA
  NR35 dB

3.0 ASSESSMENT

3.1 Plant

Proposed Plant

1No. SEL355/2 Kitchen Extract Fan

Existing Plant

1No. Toilet Extract Fan
1No. Roof-mounted Ventilation Fan

3.2 Position of Units

The kitchen extract fan is to be located within a brick outbuilding to the rear of the premises. The ductwork terminates at first floor level above the flat roof over the plant area. The toilet extract fan is ducted to outside by the rear door of the premises. The ventilation fan is roof-mounted within a cowled unit above the brick outhouse. The equipment positions are indicated on the attached Site Plan 8175/SP1.

3.3 Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the unit. The octave band sound power levels of the unit are detailed as follows:

Table 8175/T1 – Manufacturer's Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)						
		125	250	500	1k	2k	4k	8k
SEL355/2 Inlet	In-duct Lw	63	73	73	75	73	70	65
SEL355/2 Outlet	In-duct Lw	70	79	79	80	76	71	65
SEL355/2 Breakout	Lw	61	64	58	58	55	54	46

Review of the octave band data concludes that there are no tonal characteristics associated with the proposed plant.

3.4 Location of Nearest Residential Windows

The closest residential windows to the kitchen extract and ventilation plant belong to the first floor flat of 21 Swain's Lane, above Gail's, overlooking the plant area at a distance of approximately 4-5 meters. The toilet extract fan is closest to windows above the neighbouring property to the east.

3.5 Calculation of Noise Levels from Proposed Plant at Nearest Residential Window

Our calculation method for predicting noise levels from the proposed equipment at the nearest residential window, based on the information stated above, is summarised below. The fan is mounted internally so the structure of the building provides a high level of attenuation to the breakout noise level, which is therefore within the criteria. The duct-borne element has been assessed according to the following:

- Source Term SWL
- Duct Losses
- Distance Attenuation
- Directivity
- Reflections

The results of the calculations indicate a maximum noise level of 59dBA at the nearest affected residential windows. Noise from the proposed kitchen extract plant to the rear of the property is above the target criteria. We therefore recommend mitigation is included in the design and installation.

3.6 Mitigation

We recommend that an attenuator with the following minimum insertion losses be installed within the ductwork on the outlet (atmospheric) side:

Table 8175/T2 – Attenuator Minimum Insertion Losses

Minimum Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
5	10	16	25	34	34	29	22

The above specification could typically be achieved by a 900mm attenuator with 30% free area.

Adoption of an attenuator capable of achieving the above insertion losses would ensure that noise levels to the rear of the property are within the criteria required by the London Borough of Camden. The resultant predicted noise level at the nearest residential window would be 32dBA which equates to NR 27.

3.7 Existing Plant

To assess the impact of the existing plant RBA Acoustics attended site on Wednesday 26 July 2017 to measure noise from plant in operation. Due to the presence and operation of plant items serving nearby commercial premises and residences it was not possible to measure the specific sound level at the nearest noise-sensitive receptor (NSR). Therefore measurements were made of the plant in operation at 1m, and at positions representative of the nearest noise-sensitive receptors.

The toilet extract fan is fitted with an attenuator and was measured at the termination point whilst operating on full duty. It was subjectively inaudible at the termination point, making negligible change to the prevailing background noise level. Once distance losses and directionality are taken into account it is very unlikely that this item of plant will result in disturbance at the nearest assessment point; the lack of change in measured level indicating positively that the toilet extract fan is operating at 10dB below the background noise level.

The ventilation fan was also measured running on setting 2 (normal) and setting 1.

The noise climate in the absence of Gail's plant operating was dominated by plant from neighbouring commercial enterprises, plant serving residential flats, aircraft fly-bys and the surrounding road network. Therefore the real level of the operating plant could be slightly below that measured.

The noise levels measured are provided in Table 8175/T3:

Table 8175/T3 – Existing Plant – Measured Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)						
		125	250	500	1k	2k	4k	8k
Ventilation Fan (Setting 2)	L_p at 1m	54	47	41	39	32	30	25

The ventilation fan is within a cowl and approximately 5m from the nearest residential window resulting in a level of 31dBA at the nearest residential window. Both existing units therefore satisfy the London Borough of Camden noise criteria at the nearest noise-sensitive receptors. Subjectively the impact of the existing plant was negligible at the nearest noise-sensitive receptor.

4.0 CONCLUSION

Measurements of the background noise levels have been undertaken at Gail's Bakery, 21 Swain's Lane, Highgate, London N6 6QX. The noise levels of the proposed kitchen extract plant have been assessed in relation to the existing background noise climate, Local Authority criteria and the relevant standards. The kitchen extract is predicted to operate within reasonable limits and can be demonstrated as unlikely to cause complaint provided the mitigation measures suggested herein are installed. The existing plant is operating at a low noise level which, were it to be assessed as a new installation, would be demonstrated as operating within Local Authority Criteria.

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g. L_{A10}, L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.
Specific Sound Level	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval.
Rating level	Specific sound level plus any adjustment for the characteristic features of the sound.

Appendix B – Calculation

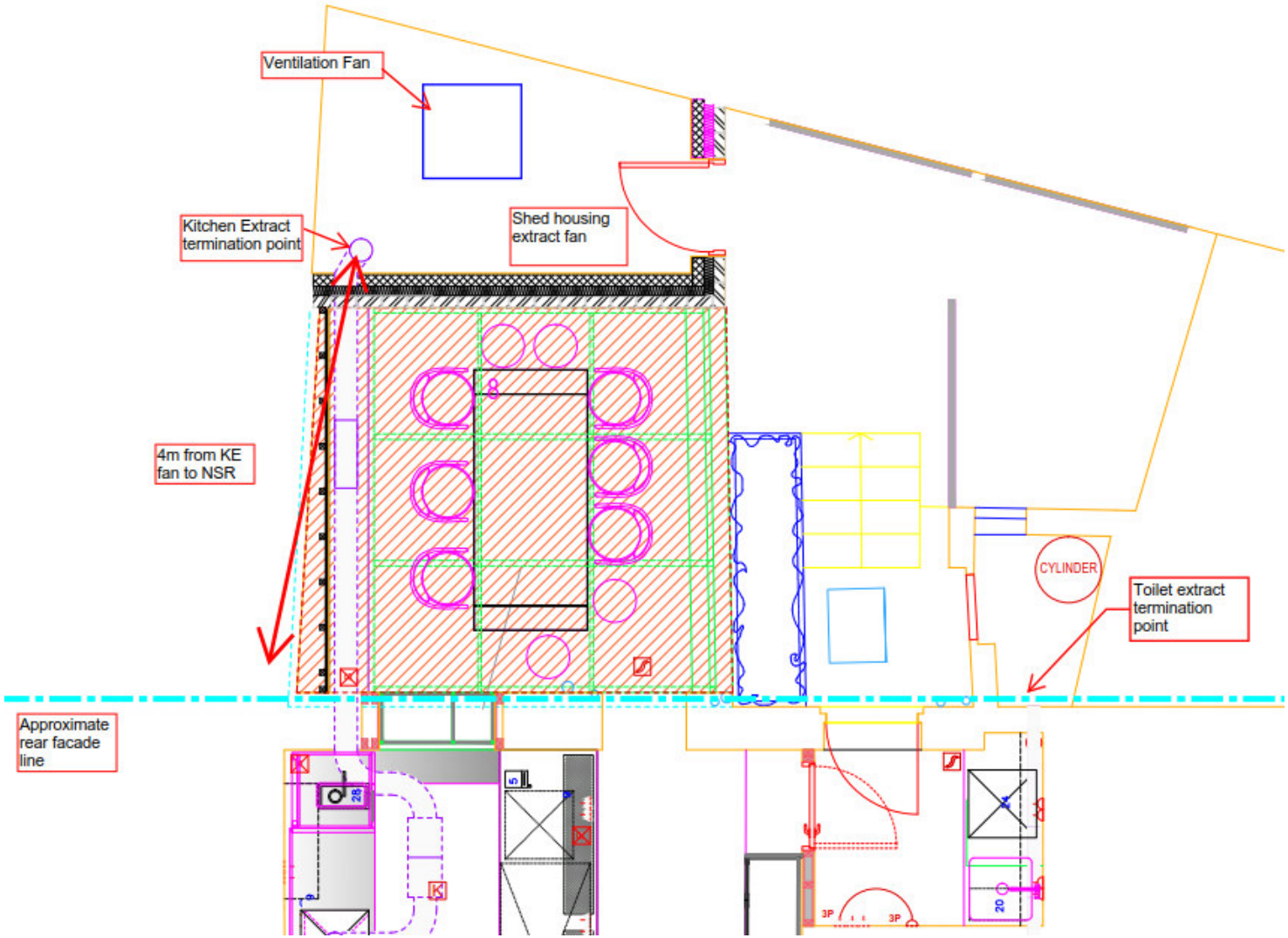
Unit	Octave-band Noise Levels								
	125	250	500	1000	2000	4000	8000		
Kitchen Extract at Termination Point (LW)	59	73	76	79	74	68	62		
Silencer	-10	-16	-25	-34	-34	-29	-22		
Directivity	-1	0	-1	-1	-6	-9	-9		
Reflections	3	3	3	3	3	3	3		
Sound Power to Sound Pressure Level	-11	-11	-11	-11	-11	-11	-11		
Distance Loss (4m)	-12	-12	-12	-12	-12	-12	-12	Overall (dBA)	NR
Noise Level at Receiver (Proposed Plant)	28	37	30	24	14	10	11	32	27
Noise Level at Receiver (Existing Plant)	40	33	27	25	18	16	11	31	25
Total Noise Level at Receiver	40	39	32	27	19	17	14	34	29

Appendix C – CDM Considerations

The following hazards pertinent to our design input have been identified and control measures suggested:

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Attenuators/ Acoustic Lagging/ Acoustic Screens	Strain of neck, limbs or back.	Contractors	3	4	12	Provide sufficient manpower/ lifting gear	1	4	4
Attenuators/ Acoustic Lagging/ Acoustic Screens	Skin and respiratory irritation	Contractors	4	3	12	Wear gloves and mask	1	3	3

L: Likelihood
S: Severity
R: Rating



Gail's Bakery, 21 Swains Lane, Highgate, London N6 6QX

Site Plan showing plant and assessment positions

Figure 8175/SP1

18 October 2017

Not to Scale

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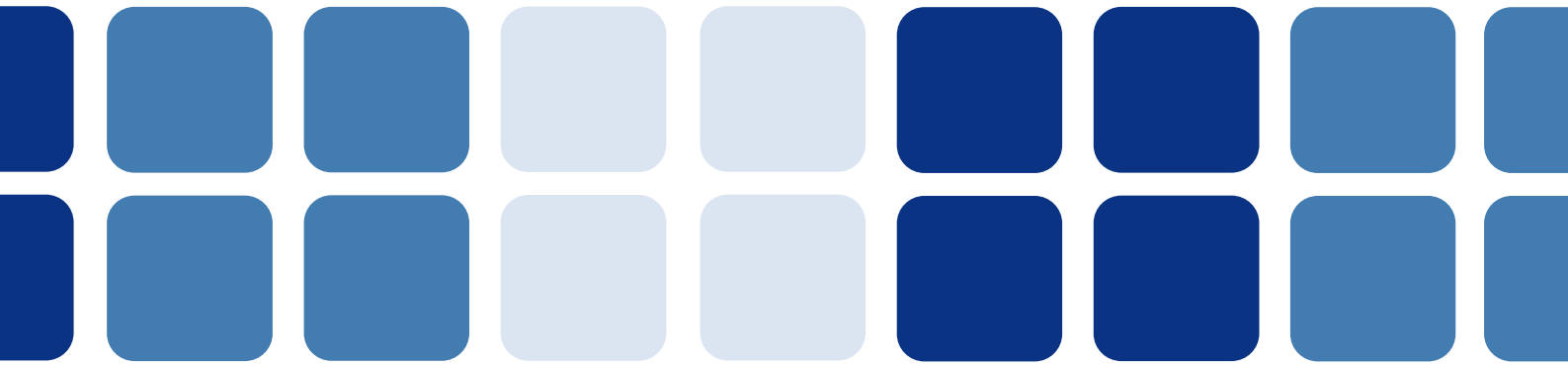

RBA Acoustic Limited • Registered Office: Priory House Pilgrims Court Sydenham Road Guildford GU1 3RX • Registered in England No. 4480894

PREVENTATIVE MAINTENANCE CONTRACT

DATE: 22nd January 2018

CLIENT: Gail's Bakery

PREMISES: Gails Bakery, 21 Swain's Ln, Highgate, London N6 6QX

SCHEDULE OF EQUIPMENT: 1 x Purified Air ESP1500EI
6 x Site Safe Carbons

WORK TO BE CARRIED OUT:

E.S.P

- Replace pre-filter, ioniser, collector and final filter. Those that are removed to be returned to Purified Air's stores for cleaning.
- Drain off accumulated grease from filter compartment
- Clean inside and outside of product with detergent
- Check door sealing material
- Check high voltage circuit
- Check function of indicator lamps

Mixed Media Filters

- Remove & Dispose of old filters
- Clean Housing
- Fit New Filters

Task	Frequency
Service 1 x ESP1500EI	Bi Annually
Change 6 x Site Safe Carbons	Annually

MAINTENANCE CONTRACT AGREEMENT

Gail's Bakery Hereafter called the 'Customer'

CCP HVAC Hereafter called the 'Contractor'

1. The contractor agrees that it shall inspect the equipment specified in the "EQUIPMENT SCHEDULE" at the frequency specified in the contract. Any item(s) found to be defective will be repaired or replaced. All parts, consumable components, cleaning materials and out of pocket expenses (I.E. Parking Fees) shall be charged extra to the above contract price unless otherwise stated in the "SCHEDULE OF RATES".
2. This "MAINTENACE CONTRACT AGREEMENT" shall become effective when a signed copy of the contract is returned.
3. In the event of a breakdown or malfunction of the equipment the Contractor shall supply all necessary parts to effect a repair which shall be charged extra to the above contract price (see note I & ii) unless stated in the "SCHEDULE OF RATES".
4. Please note that the frequencies given for the different items on this contract are only estimates. Every effort has been made to offer realistic time scales, but if items need to be cleaned/replaced at different time intervals than those specified, the Contractor cannot accept responsibility.
5. The customer agrees to accept the decision of the contractor as final with regards to methods to be employed for any work carried out on the equipment and further agrees that if the service is performed therein by anyone other than the contractors authorised engineers, or appointed agents this agreement shall be rendered null and void at the contractors discretion.
6. This agreement does not absolve the customer from the responsibility of cleaning and replacing filters and replacing consumable components in accordance with manufacturer's recommendations and instructions.
7. This agreement can be terminated by either party subject to 1 months' notice given in writing by recorded post or facsimile. In the event of the customer terminating this agreement, the contractor reserves the right to recover all costs however arising for any works executed or goods supplied prior to the termination date.

   i. Whilst stocks of spares are held, the contractor cannot guarantee that replacement parts shall be available ex-stock to effect immediate repairs. In this event the contractor shall not be deemed to have broken this agreement and all endeavours shall be made to obtain replacement components to expedite repairs. Should the components become obsolete alternative parts or new equipment shall be offered wherever possible.
   ii. The customer shall be notified before proceeding with any repair where major component item(s) are required when the value for the replacement is in excess of £500 excluding labour and valued added tax (s).
8. Contracts will increase in line with retail price index.

WARRANTY CONDITIONS

Warranty periods do vary. Please refer to your original quote. Parts & Labour cover is mandatory for the first year. Extended warranties cover parts only. Therefore labour is chargeable after the first year.

CLIMATE CONTROL PROJECTS LTD

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SITE & ADDRESS :-	INVOICE TO:-

EQUIPMENT:		INVOICE NO.
MODEL:		INVOICE DATE:
SERIAL NO:	LOCATION:	V NO:

REPORTED FAULT:
ENGINEERS REPORT:

	MATERIALS USED/REQUIRED:
	MATERIALS TOTAL

PARTS REQUIRED
YES ☐
NO ☐

JOB COMPLETED
YES ☐
NO ☐

DATE	ARRIVED	DEPARTED	LABOUR	TRAVEL

PARKING	
CONGESTION CHARGE	

F GAS LOG ON SITE	YES ☐	NO ☐
F GAS LOG UPDATED	YES ☐	NO ☐

I AGREE THAT THE ABOVE WORKS HAS BEEN CARRIED OUT TO MY SATISFACTION

ENGINEER'S NAME:	CUSTOMER'S NAME:	
ENGINEER'S SIGNATURE:	CUSTOMER'S SIGNATURE:	POSITION:

OUR SERVICE: ☺ EXCELLENT ☐ 😐 GOOD ☐ ☹ AVERAGE ☐