



Happy Valley Recreation
Limited

St Lawrence House, Reading

Odour Assessment

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1 Introduction

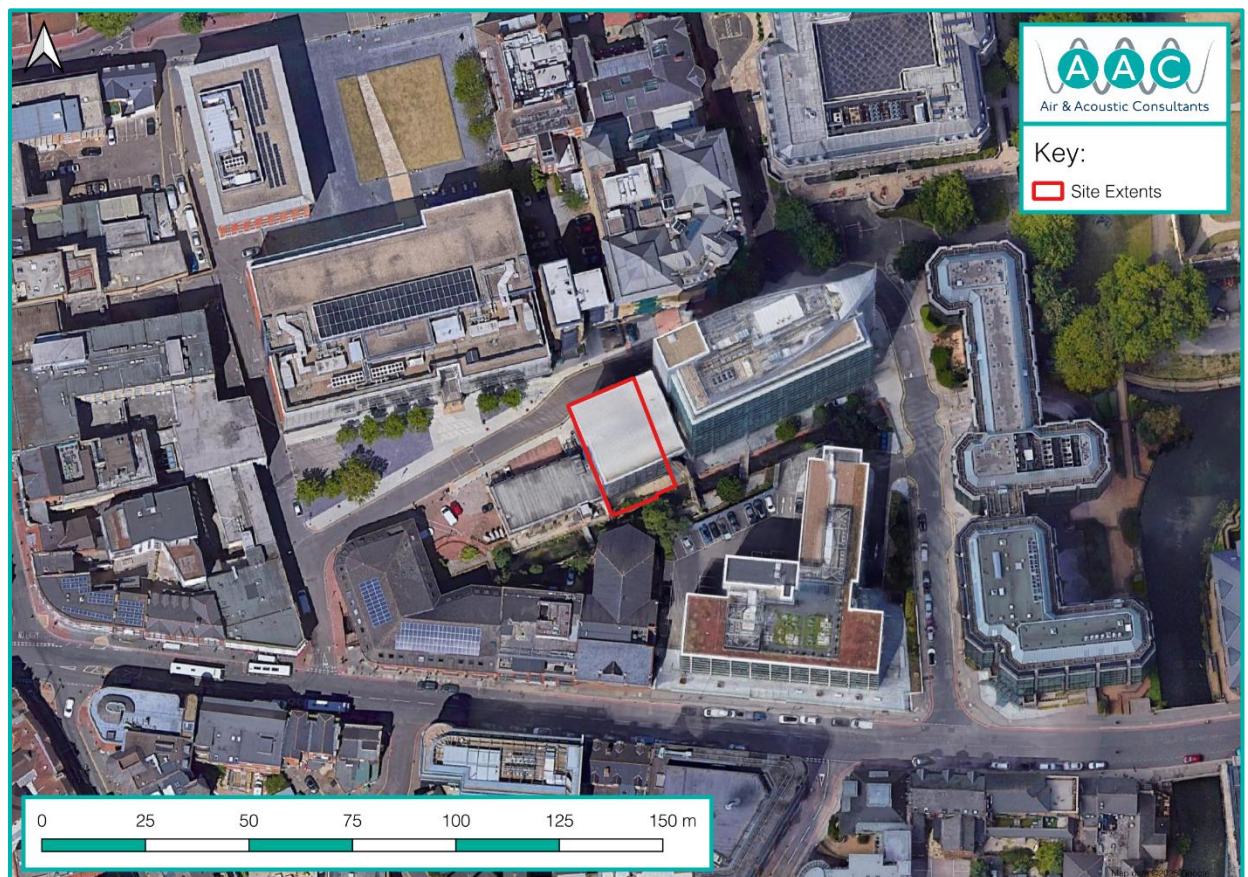
1.1 Brief

- 1.1.1 Air & Acoustic Consultants Limited have been commissioned by Happy Valley Recreation Limited to undertake an Odour Assessment (OA) in support of compliance with planning condition no.7 associated with planning approval ref: PL/23/1091 for the Change of Use to allow flexible use including Class E and Class F(1) Non-residential Institutions of St Lawrence House, Abbey Square, Reading.

1.2 Consented Site

- 1.2.1 MeKong is a proposed bakery to be situated on the ground floor of St Lawrence House, Reading which has eight storeys of residential dwellings above. The premises is located on Abbey Square which has a mixture of residential dwellings and commercial office buildings. Adjacent in the east is 'The Blade' office building and in the west is Abbey Baptist Church. Opposite in the north is a residential apartment block, further offices and Reading Crown Court in the northeast. Holy Brook is directly adjacent in the south with further office buildings and associated car parks on the opposite side of the brook.
- 1.2.2 The National Grid Reference for the centre of the site is, SU 71865 73446 (British National Grid Coordinates E: 471865, N: 173446). The site location and surrounding area are shown in [Figure 1.1](#).

Figure 1.1: Site Location



1.3 Planning Condition

1.3.1 Planning Condition no.7 states:

Prior to first occupation of any Class E(b) use an odour assessment and a detailed odour management plan to include scaled plans, odour control specifications and a maintenance plan shall be submitted to and approved in writing by the Local Planning Authority. Reference shall be made to the DEFRA guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (Jan 2005) when assessing potential odours and selecting appropriate odour control methods. Thereafter, the Class E(b) development shall not be carried out other than in accordance with the approved odour assessment and detailed odour management plan which shall be retained and maintained as such at all times thereafter.

REASON: These details are required due to insufficient information being contained within this submission and to safeguard the amenity of adjoining properties and to protect the general environment in accordance with Policy CC8 of the Reading Borough Local Plan 2019.

- 1.3.2 In regards to this condition this OA considers the implementation of a the new kitchen extraction system which is proposed to be installed behind louvres at a low level to the rear of the bakery. The development proposals are illustrated in [Figure 1.2](#) with location illustrated within Figure 1.3.

Figure 1.2: Proposed Kitchen Extract Plan

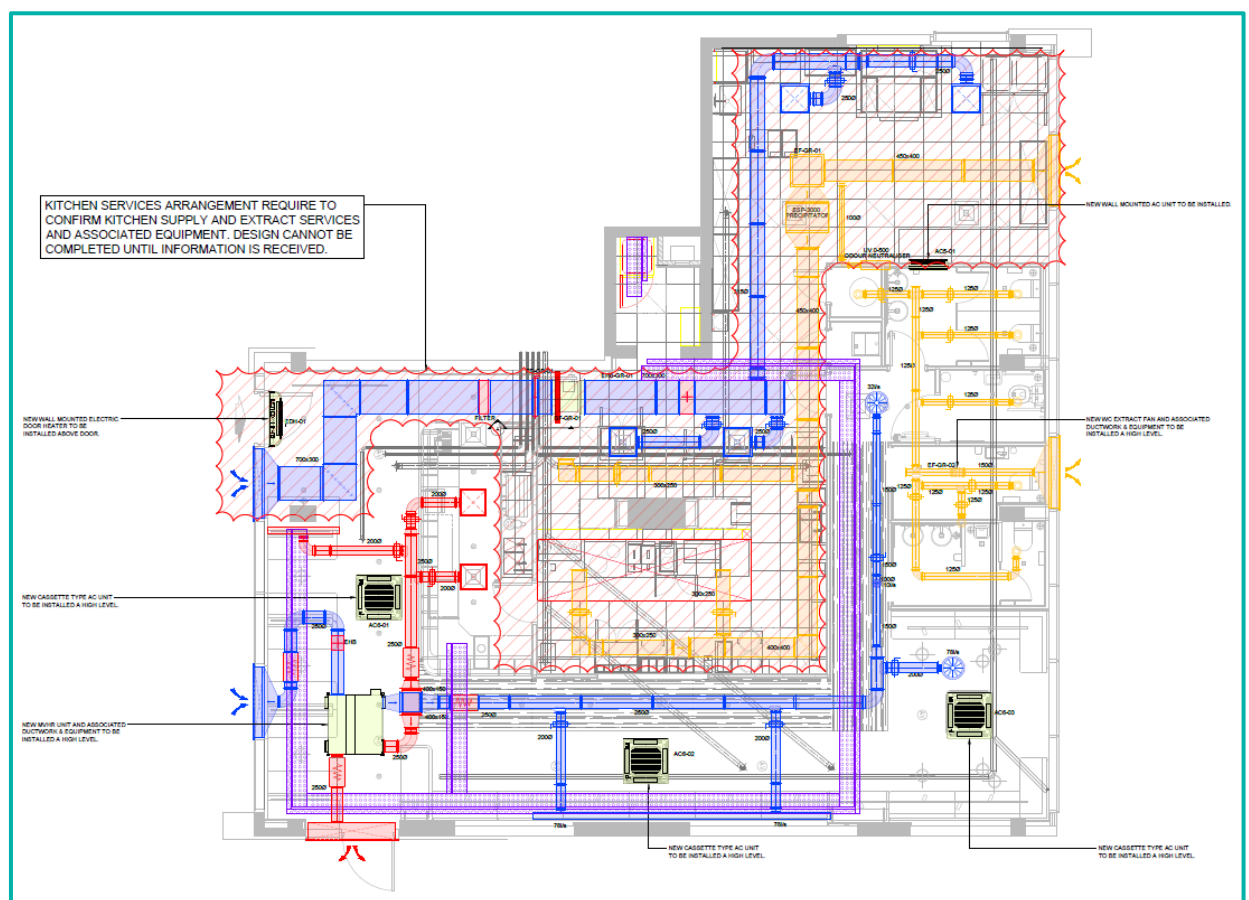


Figure 1.3: Proposed Kitchen Extract Location



1.4 Assessment Approach

- 1.4.1 This OA has been undertaken to assess if the proposed kitchen extract is likely to give rise to any significant odour impacts, and to establish the magnitude and the significance of any impact caused as a result of the proposals and determine if proposals comply with condition no.7. It is noted that condition no.7 makes reference to DEFRA guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (Jan 2005) document, but as this has been withdrawn, more up to date guidance documents have been considered within this OA.
- 1.4.2 The report is structured as follows:
- **Section 2** sets out an overview of the national and local odour policy context, in relation to the proposed duct;
 - **Section 3** details the methodology for estimating the odour impacts;
 - **Section 4** considers the operational phase odour impacts;
 - **Section 5** describes potential mitigation measures for the operational phase (where required); and
 - **Section 6** summaries and concludes the assessment.

2 Legislation and Policy Context

2.1 National Legislation, Policy and Strategy

National Planning Policy

2.1.1 The National Planning Policy Framework (NPPF)¹ (2024) sets out the planning policy for England, to help achieve sustainable development within the planning sector.

2.1.2 Paragraph 198 states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

2.1.3 Paragraph 201 states:

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Planning Practice Guidance

2.1.4 The NPPF is supported by Planning Practice Guidance (PPG)² (DCLG, 2021), which sets out the principles on how planning can take account of the impacts of new developments, and references odour.

2.1.5 Paragraph 001 Reference ID: 32-001-20191101 states:

"[...]"

"Odour and dust can also be a planning concern, for example, because of the effect on local amenity."

Statutory Nuisance

2.1.6 Under Part III of the Environmental Protection Act (1990)³, it is the duty of the local authorities to take steps as reasonably practical to investigate issues that could be a 'statutory nuisance.' Potential causes of statutory nuisance include:

- Any premises in such a state as to be prejudicial to health or a nuisance;
- Smoke emitted from premises so as to be prejudicial to health or a nuisance;
- Fumes or gases emitted from premises so as to be prejudicial to health or a nuisance;
- Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance; or

¹ Ministry of Housing, Communities & Local Government, 2024. *National Planning Policy Framework*.

² National Planning Practice Guidance web-based resource. Accessible at: <http://planningguidance.planningportal.gov.uk/>

³ UK Public General Acts, 1990. *Environmental Protection Act 1990, Chapter 43. Queen's Printer of Acts of Parliament*.

- Any accumulation or deposit which is prejudicial to health or a nuisance.

2.1.7 The local authority may serve an abatement notice on the person, premises owner or occupier if it is satisfied of the existence or likely existence of a statutory nuisance(s). Should the abatement notice not be complied with, penalties such as a fine or prosecution could occur.

2.1.8 The most likely cause of a statutory nuisance associated with this OA is odour. Odour, is defined in the Institute of Air Quality Management (IAQM) (2018) *Guidance on the Assessment of Odour for Planning*⁴ document, as:

"Mixtures of many chemicals that interact to produce what we detect as a smell. A distinction should be made between: odour-free air, containing no odorous chemicals; and fresh air, usually perceived as being air that contains no chemicals or contaminants that are unpleasant (i.e. air that smells 'clean'). Fresh air may contain odorous chemicals, but these odours will usually be pleasant in character, such as freshly-mown grass or sea spray. Perceptions of an odour - whether it is found to be acceptable, objectionable or offensive - are partly innate and hard-wired, and partly determined through life experiences and hence can be subjective to the individual."

2.1.9 Odour can be produced from a number of industries such as waste-handling and treatment developments, wastewater treatment works, some industrial processes, rural activities, cooking process (which is the processes we will be considering within this OA) and many more.

2.1.10 A number of factors can influence control of odour from commercial kitchens. These include:

- Size of the cooking facility - This influences the intensity of the odour and volume of ventilation air to be handled;
- Type of food prepared – This affects the chemical constituents within the ventilation air; and
- Types of cooking appliances used: This dictates the level of fat, water droplets and temperature within the ventilation air.

2.1.11 There is no legislation directly governing the design and performance of commercial kitchen ventilation systems. However, other regulations protecting the health and safety of employees, food safety and local amenity exist. The following legislations are considered relevant to this OA:

- The Building Regulations 2000 (in response to Building Act 1984);
- The Environmental Protection Act 1990;
- The Town and Country Planning Act 1990;
- National Planning Policy Framework (England) 2021;
- Workplace (Health, Safety and Welfare) Regulations 1992;
- Health and Safety Executive (HSE) Reference Sheet – 'Ventilation in Catering Kitchens (2017)';
- The Food Safety Hygiene (England) Regulations (2013) and EU Regulations 852/2004; and
- Relevant BESA standards for Kitchen Ventilation Systems.

⁴ Institute of Air Quality Management, 2018. *Guidance on the assessment of odour for planning*.

2.2 Local Planning Policy and Strategy

Reading Borough Local Plan

2.2.1 The Reading Borough Local Plan⁵ was adopted by Reading Borough Council (RBC) on 4th November 2019 and sets out the planning policies for developments within the jurisdiction up to 2036, and is the main consideration in deciding planning applications.

2.2.2 The Local Plan has one policy in regard to Odour.

2.2.3 Policy CC8: *Safeguarding Amenity* states:

Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

[..]

- *Dust and fumes;*
- *Smell;*

[..]

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy.

As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable.

Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes.

⁵ Reading Borough Council, 2019. *Reading Borough Local Plan*.

3 Assessment Approach

3.1 Operational Phase – Odour

- 3.1.1 The IAQM (2018) guidance recommends combining a number of assessment tools for odour studies which is unlike conventional air quality assessments. Some odour assessment tools are empirical - observing the current odour impacts or effects by monitoring or by using community assessment techniques. In contrast, other tools make use of a “model” – a simplified version of the real situation to predict what the impact might be.
- 3.1.2 The multi-tool assessment approach is summarised below, and set out in the IAQM (2018) guidance:
- Observational / Empirical: Monitoring (e.g. sniff tests) can give a measure of odour at specific locations under the conditions prevailing at the times and days of the sampling, but cannot cover all receptor locations under every meteorological condition over a typical year; and
 - Predictive: Qualitative, semi-qualitative and modelling can assist with predicting the impact from and to a proposal. Qualitative assessments are risk-based assessments using source-pathway-receptor concepts. Semi-quantitative assessments are a screening model for new proposals and dispersion modelling provides spatial and temporal coverage and the reasonableness of the estimates from the model can be compared with the observed (i.e. monitored) levels.
- 3.1.3 For the purpose of this assessment, two predictive methods were used as the development is not operational, with the respective methodologies explained below.
- [Predictive Assessment Procedure – Odour Impact Assessment](#)
- 3.1.4 The key guidance document that has been used to determine the potential odour impacts upon local receptors is the IAQM (2018) guidance, which sets out a predictive qualitative approach assessment of odour for planning, assessing the effects of a development on the closest receptors. This assessment procedure is set out in [Appendix A](#) of the document.
- 3.1.5 This guidance document provides the Source-Pathway-Receptor (S-P-R) concept developed in the Department for Environment, Food and Rural Affairs (DEFRA) (2011) *Guidelines for Environmental Risk Assessment and Management. Green Leaves III*⁶ guidance document. The S-P-R concept presents the hypothetical relationship between the source of the odour, the pathway by which exposure might occur, and the receptor that could be adversely affected. An example framework for conducting odour assessments is laid out in Appendix A of the IAQM (2018) guidance and has been followed for this assessment.
- 3.1.6 The guidance sets out a number of stages to identify the risk to odour exposure depending on receptor sensitivity.
- 3.1.7 The first stage of the guidance is used to estimate the source odour potential through identifying factors such as:
- The magnitude of the odour release (considering control measures);
 - How inherently odorous the compounds are; and

⁶ Department for Environment, Food and Rural Affairs, 2011. Guidelines for Environmental Risk Assessment and Management. Green Leaves III.

- The unpleasantness of the odour.

3.1.8 The pathway effectiveness is estimated by considering the following factors that affect odour flux:

- Distance from source to receptor;
- The frequency (%) of winds from the source to receptor (or, qualitatively, the direction of receptors from the source with respect to prevailing wind);
- The effectiveness of any mitigation / control in reducing flux to the receptor;
- The effectiveness of dispersion / dilution in reducing the odour flux to the receptor; and
- Topography and terrain.

3.1.9 As outlined in the IAQM (2018) guidance, the estimates identified for pathway effectiveness and source odour potential are considered together and compared against [Table A.2](#) in [Appendix A](#) to give a risk of odour exposure for each receptor.

3.1.10 The effect of the odour impact on the exposed receptor should be assessed next, taking into account the sensitivity of the receptor, as defined in [Table A.1](#) of [Appendix A](#). To define the sensitivity of the receptor, principles are provided in Table 2 of the IAQM (2018) guidance. This receptor level is combined with the risk of odour exposure to give the likely magnitude of odour effect at a specific receptor location, as illustrated in [Table A.3](#) of [Appendix A](#).

3.1.11 It is expected that an air quality practitioner uses professional judgement to identify the selections for each of the steps described above. The IAQM (2018) guidance suggests that “*where the overall effect is greater than ‘slight adverse’, the effect is likely to be considered significant*”.

[Predictive Assessment Procedure – Odour Risk Assessment](#)

3.1.12 Odour control must be designed to prevent odour nuisance in a given situation. Therefore, in addition to the assessment set out above, the score methodology, as set out in [Appendix B](#), should be carried out as a means of determining odour control requirements. This is conducted by using the simple risk assessment approach set out in Appendix 3 of the EMAQ+ (2022) *Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems*⁷ document. [Table B 1](#) sets out the level of odour control required based on the total score results, as set out in [Table B 2](#). The EMAQ+ (2022) document is an update to the DEFRA (2005) *Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems*⁸ document, which was withdrawn in 2017.

3.1.13 Both of the assessment approaches are set out in [Section 4](#).

⁷ EMAQ+, 2022. *Control of Odour and Noise from Commercial Kitchen Exhaust Systems*.

⁸ Department for Environment, Food and Rural Affairs, 2005. *Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems*

4 Odour Assessment

4.1 Introduction

- 4.1.1 As discussed in [Section 3](#), the OA has been carried out following the IAQM (2018) guidance set out in [Appendix A](#) and the risk assessment to determine level of odour control set out in [Appendix B](#), following the EMAQ+ (2022) guidance, both of which are considered below.
- 4.1.2 A plan of the closest receptors to the consented site and the proposed duct location are illustrated in [Figure 4.1](#). The key design features of the proposed duct are illustrated in [Appendix C](#) and [Appendix D](#).

Figure 4.1: Proposed Duct and Receptor Locations



4.2 Odour Impact Assessment

- 4.2.1 The odour impact assessment has been carried out in line with the IAQM (2018) guidance and considers the significance of the odour effects on the relevant receptors identified in [Figure 4.1](#). [Table 4.1](#) provides a summary of this assessment, setting out the different factors used to define odour effects at specified receptors, which can be used to determine whether these effects are considered 'significant' or 'not significant.'

[Source Odour Potential](#)

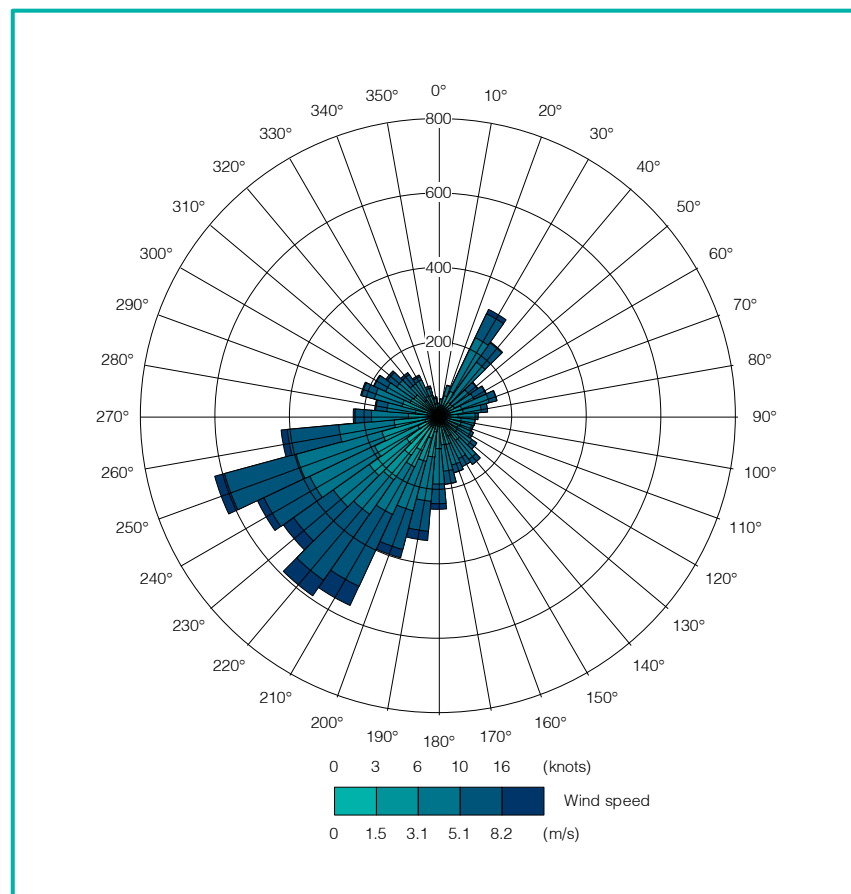
- 4.2.2 Within the IAQM (2018) guidance, there is no classification for a bakery, therefore, as a reasonable worst-case scenario, the proposed duct source potential is classified as 'Moderately Offensive' in line with Table 5 of the IAQM (2018) document.

- 4.2.3 Based on Table A.1 in Appendix A and as a worst-case scenario, it is assumed that the processes without any mitigation, would have a ‘Medium’ source odour potential, in line with the IAQM (2018) guidance.

Pathway Effectiveness

- 4.2.4 The nearest receptors to the proposed duct are located above the extract. The receptors to the north are residential with the receptors in all other directions largely consisting of commercial premises. There are some mixed-use commercial and residential receptors in the south and southeast.
- 4.2.5 In respect to the prevailing wind direction, which is the southwest (as seen in the 2024 wind rose in Figure 4.2), the wind will blow the odour from the source towards the commercial receptors adjacent to the flue to the north east. It is unlikely to impact the residential receptors to the north of the site due to the extract’s location on the southern extent of St Lawrence House.

Figure 4.2: Farnborough Meteorological Site (2024)



- 4.2.6 The discharge of air is anticipated to be low-level. The EMAQ+ (2022) guidance states that:

“The discharge of air should be at a minimum height of 1m above the roof ridge, especially if there are buildings nearby that may affect odour dispersion and dilution.”

- 4.2.7 While the proposed extract does not adhere to this guidance, since ducting for any future tenant of the ground floor commercial premises was not included when the building was originally constructed it would not be possible to retrofit ducting to the roof of the nine-storey building.

4.2.8 When considering the relative receptors for this assessment, two key receptors have been identified. These are:

- Residential receptors directly above the proposed bakery at St Lawrence House; and
- Residential receptors to the north at Abbey Point, on opposite side of Abbey Square.

4.2.9 While various commercial receptors are also considered in this assessment, since the sensitivity of these receptors is not 'High' (as set out in [Paragraph 4.2.11](#)) these are not considered key receptors to this assessment.

4.2.10 When considering the best practice elevated release level and based on [Table A.1](#) in [Appendix A](#), the odour pathway effectiveness towards the identified receptors is considered to be '**Highly Effective**' for the residential receptors directly above the proposed bakery and '**Moderately Effective**' for residential receptors at Abbey Point. In line with this, odour mitigation should be included, as set out in [Section 5](#).

[Receptors](#)

4.2.11 The consented site is located below residential units with further residential units to the north. Based on the criteria presented in [Table A.1](#) in, [Appendix A](#), these receptors are considered to have a '**High**' sensitivity. Commercial receptors are situated in all other directions; these receptors are considered to have '**Medium**' sensitivity.

[Odour Magnitude Effect](#)

4.2.12 Based on the results above and the criteria in [Table A.2](#), the risk odour exposure is considered to be '**Medium Risk**' for the residential units above the bakery and '**Low Risk**' for all other nearby residential and commercial receptors.

4.2.13 Based on the IAQM (2018) guidance, the likely magnitude of odour effect from the proposed duct is considered to be '**Moderate Adverse Effect**' for the residential units above the proposed bakery and '**Slight Adverse Effect**' for all other residential and commercial receptors. The IAQM (2018) guidance states:

"Where the overall effect is greater than "slight adverse," the effect is likely to be considered significant. Note that this is a binary judgement: either it is "significant" or "not significant"."

4.2.14 Therefore, based on IAQM (2018) guidance, as referenced in [Section 3](#), the overall effect resulting from this indicative assessment is considered to be '**Significant**.'

Table 4.1: Summary of Possible Odour Effects at Existing Sensitive Receptors

Receptor Details and Location	Source Odour Potential	Pathway (Transport Effectiveness)	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
St Lawrence House (Residential, 0 m downwind)	Medium	Highly Effective	Medium Risk	High	Moderate Adverse Effect
Abbey Point (Residential, 40 m upwind)	Medium	Moderately Effective	Low Risk	Medium	Negligible Effect
The Blade (Commercial / Office, 13 m downwind)	Medium	Highly Effective	Medium Risk	Medium	Slight Adverse Effect
Abbey Gardens (Commercial / Office, 78 m downwind)	Medium	Moderately Effective	Low Risk	Medium	Negligible Effect
27 King's Road (Commercial / Office, 13 m upwind)	Medium	Ineffective	Negligible Risk	Medium	Negligible Effect
Abbey Baptist Church (Commercial, 15 m upwind)	Medium	Ineffective	Negligible Risk	Medium	Negligible Effect
The White Building (Commercial / Office, 24 m upwind)	Medium	Ineffective	Negligible Risk	Medium	Negligible Effect

4.2.15 In summary, the odour effects on receptors at St Lawrence House are determined to be '**Moderate Adverse Effect**', while the odour effects at The Blade are determined to be '**Slight Adverse Effect**' and '**Negligible Effect**' at all other residential and commercial receptors.

4.2.16 The IAQM (2018) guidance states:

"Where odour effects are assessed as significant, details of appropriate further mitigation and control measures that could allow the proposal to proceed without causing significant loss of amenity."

4.2.17 Since the odour effects are determined to be '**Moderate Adverse**' at the worst-case assessment, odour effects are assessed as '**Significant**' and therefore mitigation is required. Therefore, some mitigation measures are set out in [Section 5](#).

4.3 Odour Risk Assessment

4.3.1 Based on the criteria in [Appendix B](#) of this report, a risk assessment has been carried out to determine the level of odour control measure required. [Table 4.2](#) provides a summary of this assessment, setting out the different scores for each criterion set out in [Table B 2](#). The scores are added up to give a total score, which is then compared to [Table B 1](#) to determine the level of odour mitigation required.

Dispersion

- 4.3.2 The release level discharge is proposed as low-level from louvres at the rear of the ground floor. This indicates that dispersion will therefore be 'very poor'. Therefore, in line with the EMAQ+ (2022) guidance, dispersion will be given a score of **20**.

Proximity to Receptors

- 4.3.3 As stated previously, the closest receptors are located above the extraction plant exit point. In line with the EMAQ+ (2022) guidance, this is classified as close, and given the maximum score of **10**.

Size of Kitchen

- 4.3.4 It is unclear the exact size of the proposed bakery; therefore, an assumption has been made that there will be between 30 – 100 covers. On this basis, in line with the EMAQ+ (2022) guidance, the size of kitchen is classified as medium, and is given the score of **3**.

Cooking Type

- 4.3.5 As the catering establishment is a bakery, in line with the EMAQ+ (2022) guidance, the cooking type (odour and grease loading score) score of **4** is given, as odour and grease loading is expected to be high.

Table 4.2: Summary of Possible Odour Effects at Existing Sensitive Receptors

Source	Dispersion	Proximity of Receptors	Size of Kitchen	Cooking Type	Total Score
Kitchen Extract	20	10	3	4	37

- 4.3.6 The total score from Table 4.2 indicates a requirement for a '**very high level odour control**' (in line with Table B 2 of Appendix B), as the significance score is above 35.
- 4.3.7 It should be noted that this score is based on no odour mitigation measures being utilised. However, some potential mitigation measures are set out in Section 5.

5 Mitigation Measures

5.1 Odour

- 5.1.1 In regard to the previous sections of this report, it has been determined that the risk of odour exposure is low. The likely odour effect has been determined as having a potential '**Moderate Adverse Effect**' classification, and therefore the effects are considered to be '**significant**' for the proposed duct.
- 5.1.2 As the odour effects are considered to be 'significant', the odour risk assessment, carried out in line with the EMAQ+ (2022) guidance, suggested that '**very high level odour control**' is required for the proposed duct, based largely on the location of the kitchen extract and its proximity to sensitive receptors. This is based on no mitigation measures being utilised, however some have been included.
- 5.1.3 The EMAQ+ guidance also states that 'very high level odour control' mitigation measures may include:
1. Fine filtration or Electrostatic Precipitator (ESP) followed by carbon filtration (carbon filters rated with a 0.4 – 0.8 second residence time).
 2. Fine filtration or ESP followed by carbon filtration and by counteractant/neutralising system to achieve the same level of control as 1.
 3. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.
- 5.1.4 The proposed duct includes an ESP 3000 with a max air volume up to 1.4 m³/second. This ESP filters up to 98% of oil, grease and smoke particles with a diameter of 0.01 micrometres. The full specification for the proposed ESP is set out in [Appendix C](#).
- 5.1.5 Additionally, a UV-O 500 odour oxidiser is proposed to be connected to the extract system to assist in neutralising odour through a process known as ozonolysis. For optimum performance, the manufacturer recommends a residence time of between 2 – 6 seconds between the UV-O 500 system and the external extract. This process uses ozone and hydroxyl free radicals to oxidise cooking odours, reducing the odour by up to 90%. The full technical specification is presented within [Appendix D](#).
- 5.1.6 The EMAQ+ guidance states that:
- "Counteracting agents, as the term implies, are added to the air stream and result in a reduced response to the odour by the human nose by reducing the perceived intensity. Thus, in effect, the counteracting agent desensitises the human nose and renders the discharged odour undetectable by the olfactory sensors in the nose."*
- 5.1.7 It is pertinent to note that odour oxidisers require regular cleaning to ensure their efficiency remains high.
- 5.1.8 Therefore, it is anticipated that the proposed duct includes mitigation measures relevant to a 'very high level odour control', provided the optimum residence time of 2 – 6 seconds between the UV-O system and extract is achieved, which would conform to the manufacturer's guidance. These mitigation measures are expected to significantly reduce the cooking odours emitted from the kitchen extract, so it is not anticipated that any nuisance would be caused to the residential dwellings by the proposed extract at St Lawrence House.

6 Summary & Conclusions

6.1 Odour

- 6.1.1 A qualitative assessment of the odour effects has been undertaken for the proposed extract. Based on the results presented in [Section 4](#) of this report, the residual odour effects are considered to be '**significant**', and the risk assessment determined that '**very high level odour control**' is required for the proposed duct. As the proposed duct specification suggests that inherent mitigation measures in line with 'very high level odour control' are included (provided they are installed to the manufacturer's recommendations), the proposed duct is anticipated to abide by the minimum best practice mitigation requirements of a commercial kitchen as laid out by the EMAQ+ (2022) guidance.
- 6.1.2 The proposed duct is therefore expected to comply with condition no.7 and relevant odour policy with appropriate mitigation in place.

Appendices



APPENDIX A – ODOUR IMPACT ASSESSMENT

Table A.1: Examples of Risk Factors for Odour Source, Pathway and Receptor Sensitivity

Source Odour Potential	Pathway Effectiveness	Receptor
Factors affecting the source odour potential include: - the magnitude of the odour release (taking into account odour-control measures) - how inherently odorous the compounds are - the unpleasantness of the odour	Factors affecting the odour flux to the receptor are: - distance from source to receptor - the frequency (%) of winds from the source to receptor (or, qualitatively, the direction of receptors from source with respect to prevailing wind) - the effectiveness of any mitigation/control in reducing flux to the receptor - the effectiveness of dispersion/dilution in reducing the odour flux to the receptor - topography and terrain	For the sensitivity of people to odour, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the following general principles:
Large Source Odour Potential Magnitude – Larger Permitted processes of odorous nature or large STWs; materials usage hundreds of thousands of tonnes/m³ per year; area sources of thousands of m². The compounds involved are very odorous (e.g. mercaptans), having very low Odour Detection Thresholds (ODTs) where known. Unpleasantness – processes classed as “Most offensive” in Table 5; or (where known) compounds/odours having unpleasant (-2) to very unpleasant (-4) hedonic score. Mitigation/control – open air operation with no containment, reliance solely on good management techniques and best practice.	Highly Effective Pathway for Odour Flux to Receptor Distance – receptor is adjacent to the source/site; distance well below any official set-back distances. Direction – high frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind). Effectiveness of dispersion/dilution – open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.	High sensitivity receptor - surrounding land where: - users` can reasonably expect enjoyment of a high level of amenity; and - the people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples may include residential dwellings, hospitals, schools/education and tourist/cultural.
Medium Source Odour Potential Magnitude – smaller Permitted processes or small Sewage Treatment Works (STWs); materials usage thousands of tonnes/m³ per year; area sources of hundreds of m². The compounds involved are moderately odorous. Unpleasantness – processes classed in H4 as “Moderately offensive”; or (where known) odours having neutral (0) to unpleasant (-2) hedonic score. Mitigation/control – some mitigation measures in place, but significant residual odour remains.	Moderately Effective Pathway for Odour Flux to Receptor Distance – receptor is local to the source. Where mitigation relies on dispersion/dilution – releases are elevated, but compromised by building effects.	Medium sensitivity receptor – surrounding land where: - users` would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or - people would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples may include places of work, commercial/retail premises and playing/recreation fields.

Source Odour Potential	Pathway Effectiveness	Receptor
Small Source Odour Potential Magnitude – falls below Part B threshold; materials usage hundreds of tonnes/m³ per year; area sources of tens m². The compounds involved are only mildly odorous, having relatively high ODTs where known. Unpleasantness – processes classed as “Less offensive” in H4; or (where known) compounds/odours having neutral (0) to very pleasant (+4) hedonic score. Mitigation/control – effective, tangible mitigation measures in place (e.g. BAT, BPM) leading	Ineffective Pathway for Odour Flux to Receptor Distance – receptor is remote from the source; distance exceeds any official set-back distances. Direction – low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind). Where mitigation relies on dispersion/ dilution – releases are from high level (e.g. stacks, or roof vents >3m above ridge height) and are not compromised by surrounding buildings	Low sensitivity receptor – surrounding land where: - the enjoyment of amenity would not reasonably be expected; or - there is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial, farms, footpaths and roads.
Notes: A Minimum “setback” distances may be defined for some odorous activities: for example, standard setback distances for livestock housing units are a popular tool for odour regulation in Australia and New Zealand, Europe and the United States.		

Table A.2: Risk of Odour Exposure at the Specific Receptor Location

Pathway Effectiveness	Source Odour Potential		
	Small	Medium	Large
Highly Effective Pathway	Low Risk	Medium Risk	High Risk
Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

Table A.3: Likely Magnitude of Odour Effect at the Specific Receptor Location

Risk of Odour Exposure	Receptor Sensitivity		
	Small	Medium	High
High Risk of Odour Exposure	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Risk
Medium Risk of Odour Exposure	Negligible Risk	Slight Adverse Effect	Moderate Adverse Effect
Low Risk of Odour Exposure	Negligible Risk	Negligible Risk	Slight Adverse Effect
Negligible Risk of Odour Exposure	Negligible Risk	Negligible Risk	Negligible Risk

APPENDIX B – ODOUR RISK ASSESSMENT

Table B 1: Odour Control Requirement Based on Risk Score

Impact Risk	Odour Control Requirement	Significance Score
Low to Medium	Low-Level Odour Control	< 20
High	High-Level Odour Control	20 – 35
Very High	Very High-Level Odour Control	> 35

Table B 2: Risk Scores Based on Criteria

Criteria	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 to 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. Turkish, Middle Eastern or any premises cooking with solid fuel.
	High	7	Vietnamese, Thai, Indian, Japanese, Chinese, steakhouse.
	Medium	4	Cantonese, Italian, French, Pizza (gas-fired),
	Low	1	Most pubs (no fried food, mainly reheating and sandwiches etc), Tea rooms.

APPENDIX C – EXTRACTION SYSTEM SPECIFICATION

KITCHEN EXTRACT

ESP RANGE

1500 | 3000 | 4500 | 6000

purifiedair®

COMMERCIAL KITCHEN FILTRATION EXPERTS

Purified Air Ltd. has been manufacturing and servicing market-leading technology to filter and control oil, grease, smoke and odour from commercial kitchens since 1984.

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KITCHEN EXTRACT

ESP RANGE

1500 | 3000 | 4500 | 6000



Our ESPs have been specifically designed for kitchen extract systems; 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 build-ups of grease within the ducting.

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 cooking odours.

KEY FEATURES

- Eliminates up to 98% of oil, grease and smoke particles
- Filters particles down to sub-micron levels
- Produces Ozone to help reduce malodours
- Designed with an integral sump
- Modular in design
- Specifically designed for commercial kitchen application
- Energy efficient: - uses no more than 50W
- Greatly reduces grease build-up within the duct run
- IP65 rated for outside location

FILTERS REMOVE



Smoke



Steam

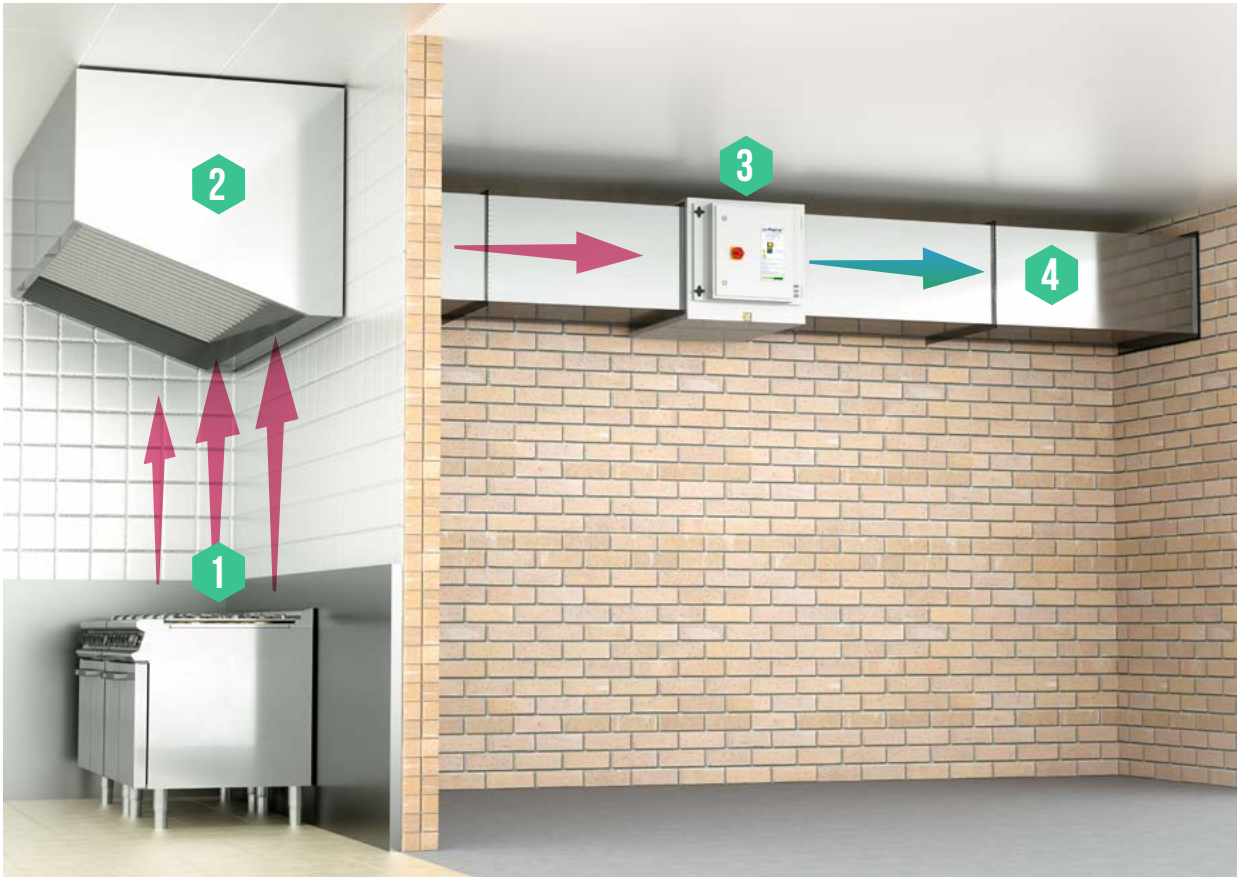


Oil



Grease

HOW IT WORKS



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

- 01

Cooking particulates and odours
- 02

Canopy Grease Filter
- 03

ESP - Particulate Control Unit
- 04

Airflow

OUR SERVICES



Design

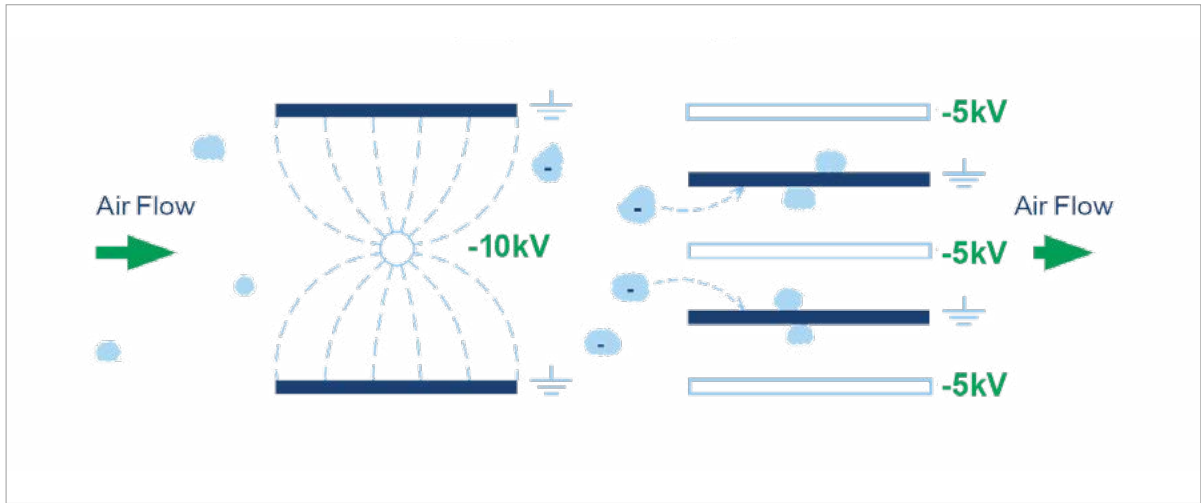


Manufacture



Maintain

THE ELECTROSTATIC PROCESS



The above diagram shows, in a basic visual, how an electrostatic precipitator works:

As air passes into the combined ioniser / collector cell, the particulates in the air stream are polarised. As they continue through the ioniser and between the collector cell plates,

the polarised particulates are repelled away from the negatively charged plates and attracted to the earthed plates where they stick and so are filtered out of the air flow.

THE BENEFITS OF ELECTROSTATIC TECHNOLOGY



Eliminates up to 99% of particles



Filters particles down to sub-micron levels



Modular design



Energy efficient

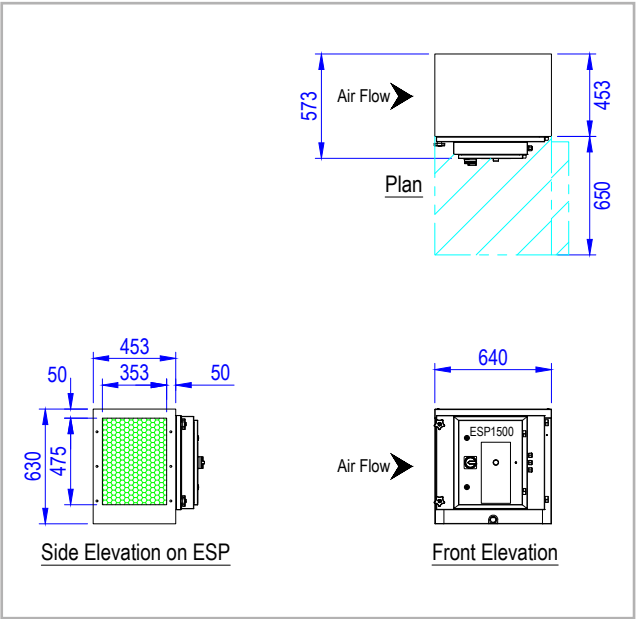
TECHNICAL SPECIFICATION

	ESP 1500	ESP 3000	ESP 4500	ESP 6000
Supply	220-240 V 50-60HZ	220-240 V 50-60HZ	220-240 V 50-60HZ	220-240 V 50-60HZ
Power Consumption	20 _W	30 _W	40 _W	50 _W
Maximum Airflow	0.7 M ³ /SEC (UP TO)	1.4 M ³ /SEC (UP TO)	2.1 M ³ /SEC (UP TO)	2.8 M ³ /SEC (UP TO)
Dimensions (mm)	W 450 H 630 D 640	W 900 H 630 D 640	W 1350 H 630 D 640	W 1800 H 630 D 640
Weight	55 _{KG}	85 _{KG}	118 _{KG}	153 _{KG}

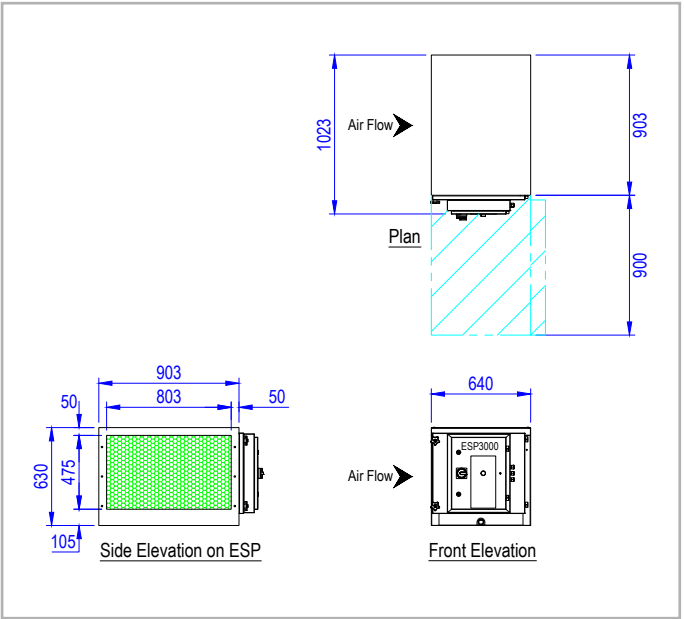
Please note: This equipment needs to be interlocked with the extract fan.

DRAWINGS

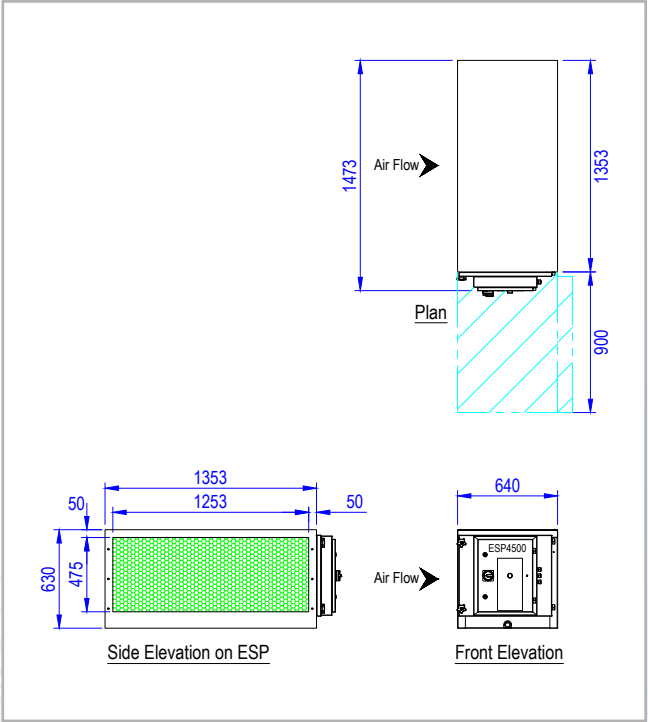
ESP 1500



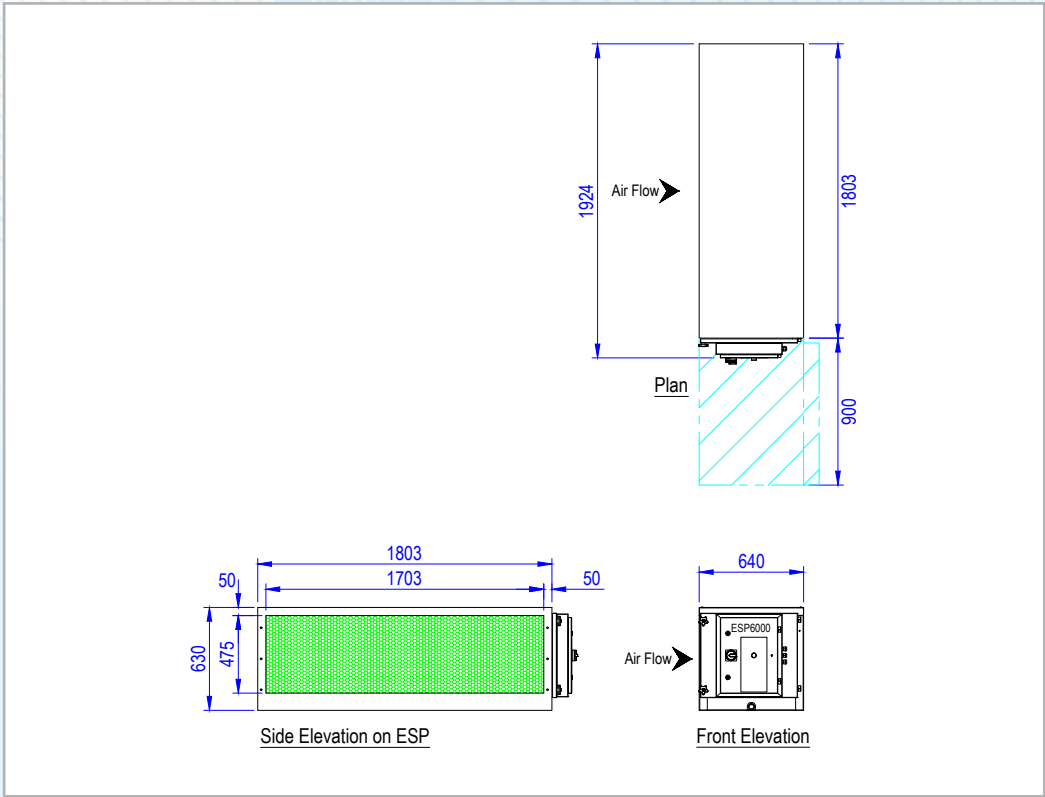
ESP 3000



ESP 4500



ESP 6000



KITCHEN EXTRACT

ESP AUTOWASH



The ESP Autowash system was first made available in 2012. Since then, we have continually developed the product to make it a cost-effective way of cleaning the ESP interior. This reduces the frequency of required manual service visits which provides

long-term savings for the customer. In addition, the straightforward setup and option for retrofitting to existing Purified Air ESP systems mean the Autowash is easy to install.

KEY FEATURES

The control, detergent and water supply is housed in one control station which is placed next to the ESP unit(s). One control station can operate up to six ESP units but is also cost effective when only used with a single ESP. The main control is a PLC and this can be programmed to suit the number of ESP units and it will initiate a timed rinse, wash and dry program whilst it locks out the supply to the ESP unit(s). The wash program can be initiated manually or on a timed basis when the extract system is not in operation.

The system comes fitted with a warning indicator lamps to notify the user when there is a system fault and when the unit is operational. These controls can be wired to work autonomously or via a building management system (BMS).



01 Wash nozzles 02 Supply pipe

NOZZLE ATTACHMENT

Each ESP unit has a bespoke nozzle attachment which is pre piped with two wash nozzles per collector. These are fitted in place of the standard top filter guide and can also be easily retro fitted to any post 2015 unit.

SERVICING

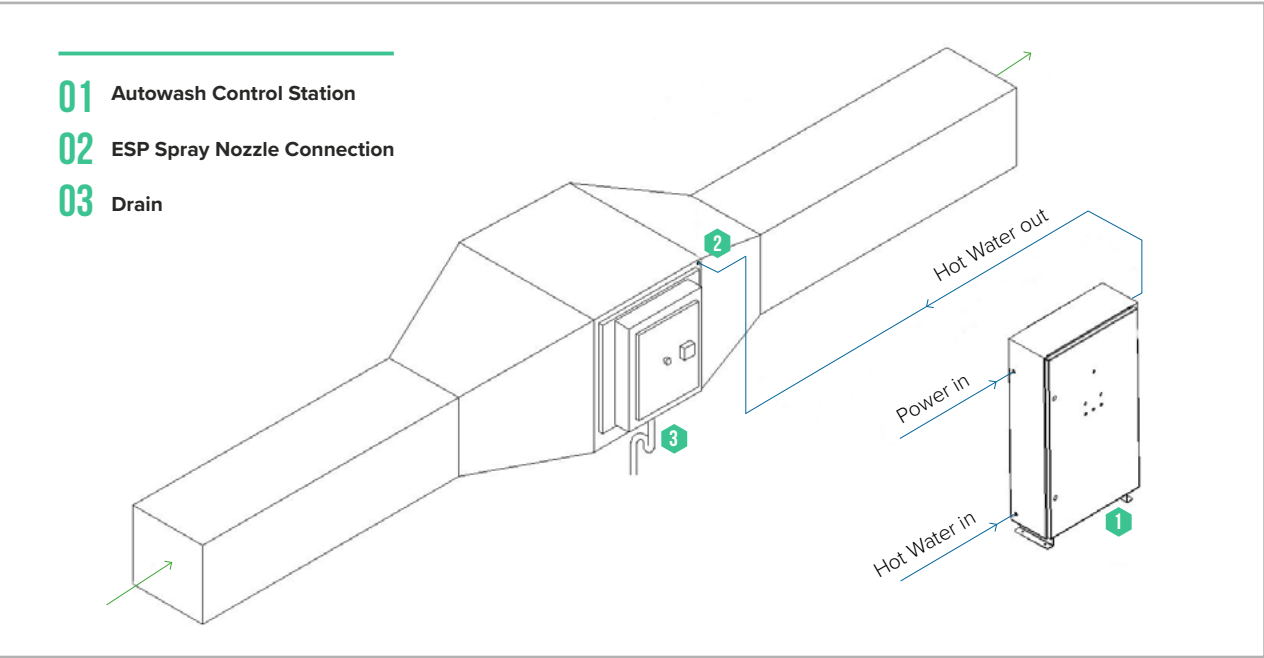
The Autowash system is designed to reduce manual maintenance manual maintenance visits, not replace them altogether. Collectors should still be checked and manually washed approximately once every three months. Mesh filters need to be checked monthly.

HOW IT WORKS

Start either manually or by pre-programmed 24 hour timer. There is an interface to cut-off the ESP and main extract fan and a 60 sec delay to allow the ESP to discharge and extract fan to stop.

DURATION			DURATION		
01	Pre-wash with hot water on the collection cells	20s	06	Stop & drip dry	15s
02	Stop drip dry	15s	07	Detergent Spray	30s
03	Detergent spray	30s	08	Stop & detergent reaction	60s
04	Stop & detergent reaction	60s	09	Rinse	20s
05	Rinse	20s	10	Stop & drip dry	120s

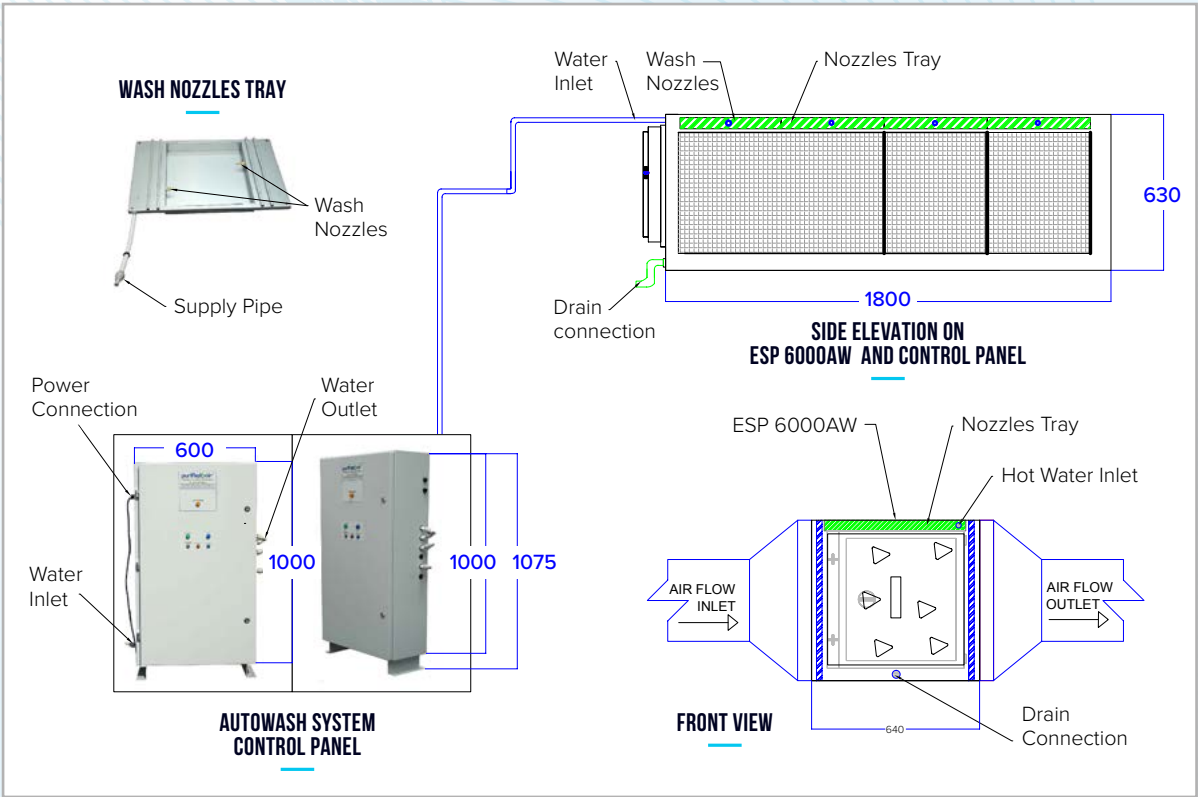
Re-start extract fan for forced drying for 60mins
Re-start complete system back to normal working operation.



TECHNICAL SPECIFICATION

Autowash	
Wash Cycle Power Usage	35W
Electrical Supply	220/240V/1Ph/50-60Hz
Water Supply	24 litres/minute
Weight	40 kg
Water Pressure	2 bar
Dimensions	Width: 600mm
	Depth: 250mm
	Height: 1075mm

TECHNICAL DRAWINGS



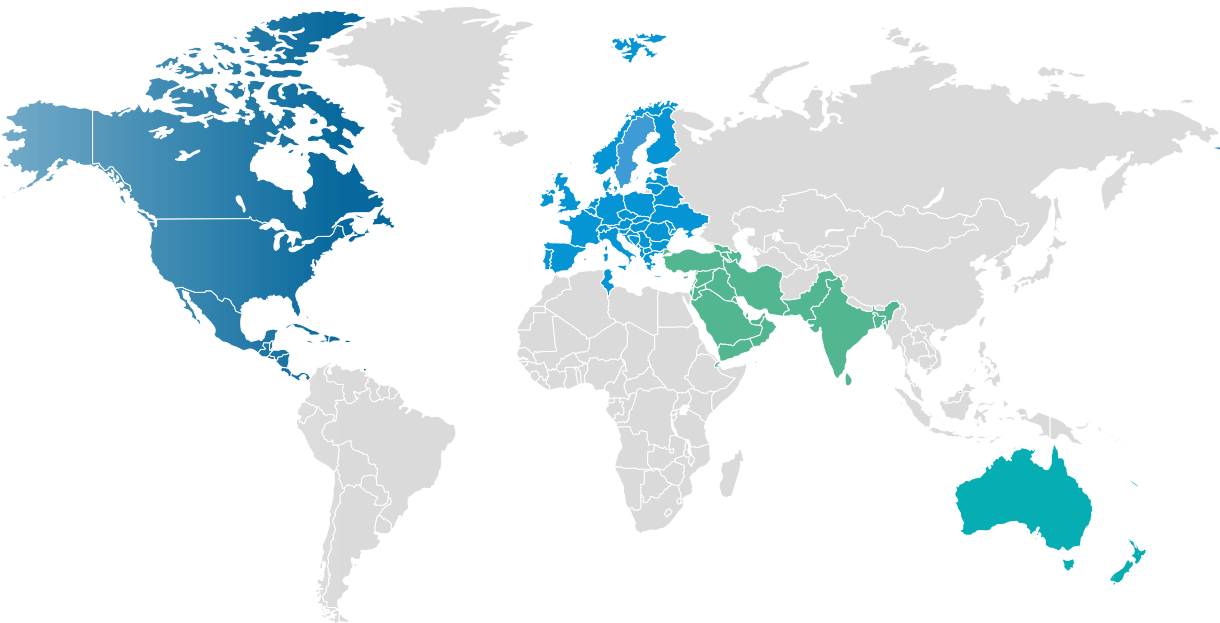
ABOUT US

Purified Air Ltd. has been striving to find the best and most cost-effective way to filter and control oil, smoke, fat and odour produced by commercial kitchens and service since 1984.

Purified Air manufactures filtration and odour control products for stock and bespoke systems, supplying systems to many sectoral brands. The design of each solution is based on the type of food cooked, the cooking process used, and the extracted air volume providing tried and tested purified kitchen exhaust air for Fast Food, Casual Dining and Luxury Concept Restaurant (Fine Dining) markets. By working with these variables, we can design and supply some of the world's best commercial kitchen filtration and odour control systems.

WORLDWIDE COVERAGE

- United Kingdom
- Middle East
- Europe
- Asia
- Australasia
- North America



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purifiedair®

purifiedair.com

APPENDIX D – ODOUR OXIDISER SPECIFICATION

KITCHEN EXTRACT

UV-0 RANGE

500 | 1000

purified[®]air

COMMERCIAL KITCHEN FILTRATION EXPERTS

Purified Air Ltd. has been manufacturing and servicing market-leading technology to filter and control oil, grease, smoke and odour from commercial kitchens since 1984.

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KITCHEN EXTRACT

UV-O RANGE

500 | 1000



Unlike other UV-C systems, our UV-O units are located outside of the kitchen extract duct and are connected via a spigot and spiral ducting.

KEY FEATURES

- ➔ Easy to install
- ➔ Can be retro-fitted into existing duct
- ➔ Virtually no pressure loss
- ➔ No monthly maintenance needed

UV-O TECHNOLOGY

The UV-O range uses UV-C technology which is based on the synergy of oxygen and ultraviolet light to produce ozone. The ozone acts on the gases by changing their molecular structure, reduce the smells and breaking down odours in the ductwork ready for extraction.

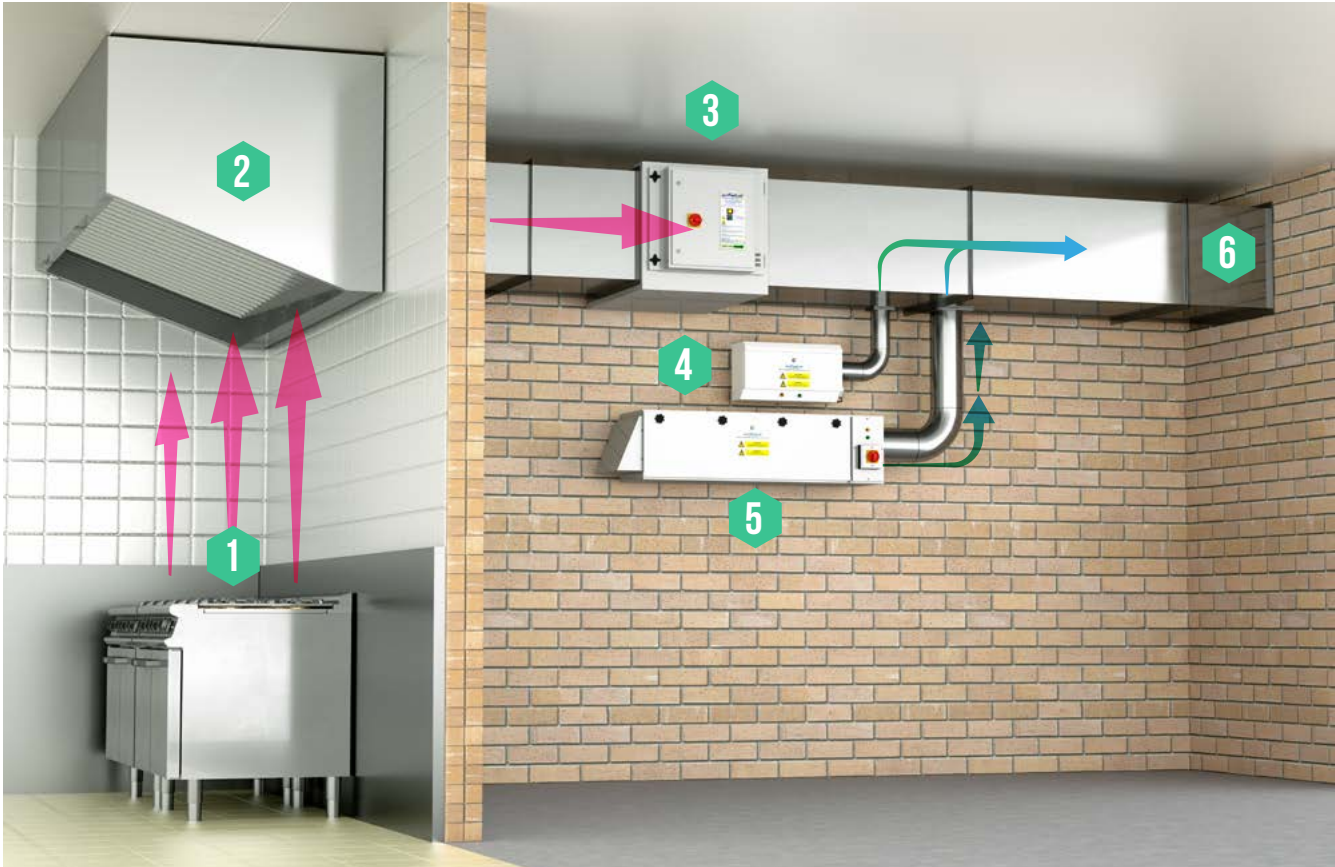
Unlike other UV-C systems, our UV-O units are located outside of the kitchen extract duct and are connected via a spigot and small diameter ducting.

Although it is widely accepted that the best way to apply UV-C light is directly in-line with the air stream itself, performance will be impacted as the lamps get dirty.

With our UV-O units the air flow does not come from the exhaust duct but from the ambient air around the unit, which is filtered on entry. This means that it is able to provide a uniform supply of ozone and hydroxyl free radicals into the extract system with an extremely low pressure loss.

For optimum performance we would recommend between 2 & 6 seconds of dwell time to allow the ozone to work effectively upon the malodorous gasses within the duct.

HOW IT WORKS



For optimum performance, we would recommend between 2 & 6 seconds of dwell time to allow the ozone to work effectively upon the malodorous gasses within the duct.

When installed correctly our UV-O systems can reduce cooking odours by up to 90%.

- 01

Cooking particulates and odours
- 02

Canopy Grease Filter
- 03

ESP - Particulate Control Unit
- 04

UV-O 500
- 05

UV-O 1000
- 06

Ozone breaks down odours within the duct

THE BENEFITS OF UV-O TECHNOLOGY

- Reduces odours by up to 90%
- Easy to retro fit
- Low maintenance
- Low pressure loss

TESTED & VERIFIED BY

This unit's tried and tested UV-C technology allows commercial kitchens to be sited in locations such as residential areas and shopping centres, where previously planning permission may not have been granted. After extensive research and development Purified Air are able to devise the best combination of lamps to provide the most effective odour control.

OUR SERVICES



Design



Manufacture



Maintain

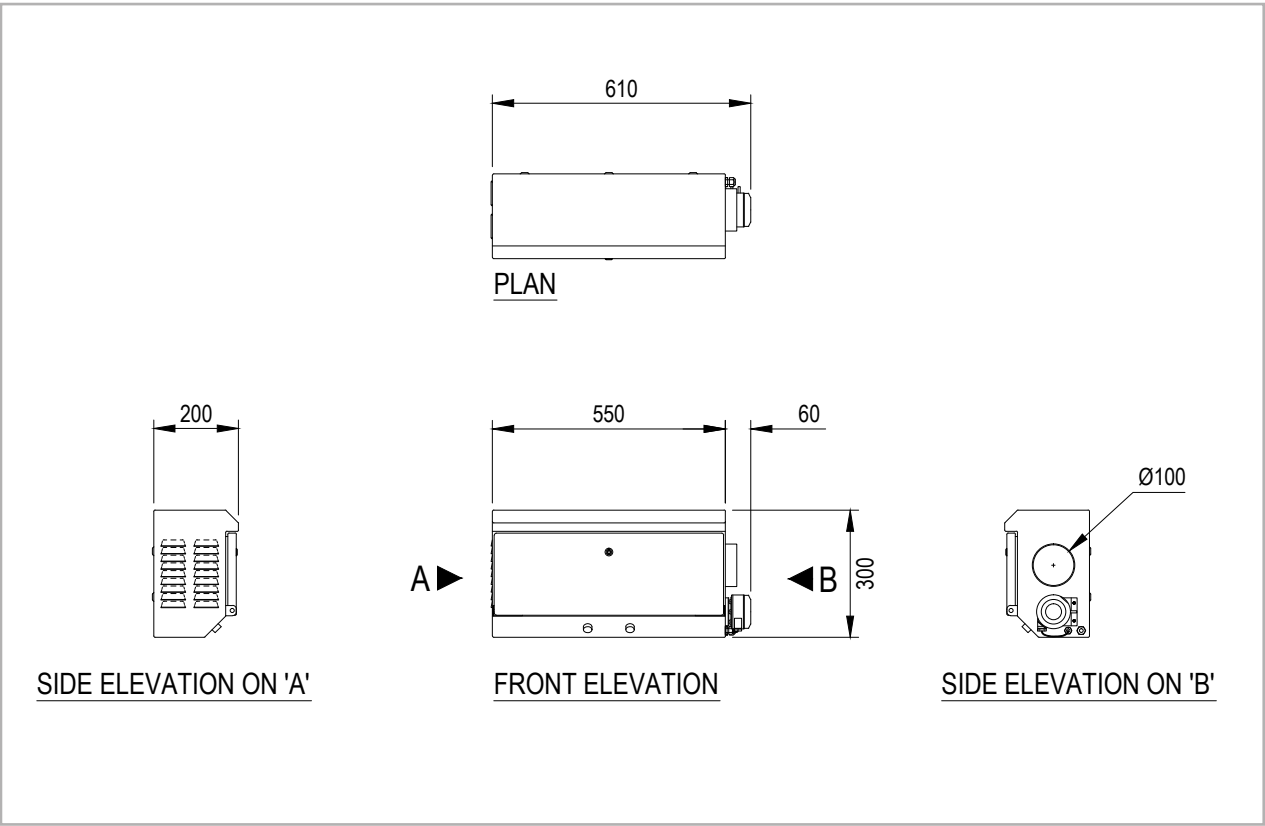
TECHNICAL SPECIFICATION

	UV-O 500	UV-O 1000
Supply	220-240 _{V 50-60HZ}	220-240 _{V 50-60HZ}
Power Consumption	140 _W	640 _W
Maximum Airflow	1.5 _{M³/SEC (UP TO)}	2.5 _{M³/SEC (UP TO)}
Dimensions (mm)	W 610 H 300 D 200	W 1521 H 350 D 404
Weight	10.5 _{KG (APPROX)}	50 _{KG (APPROX)}

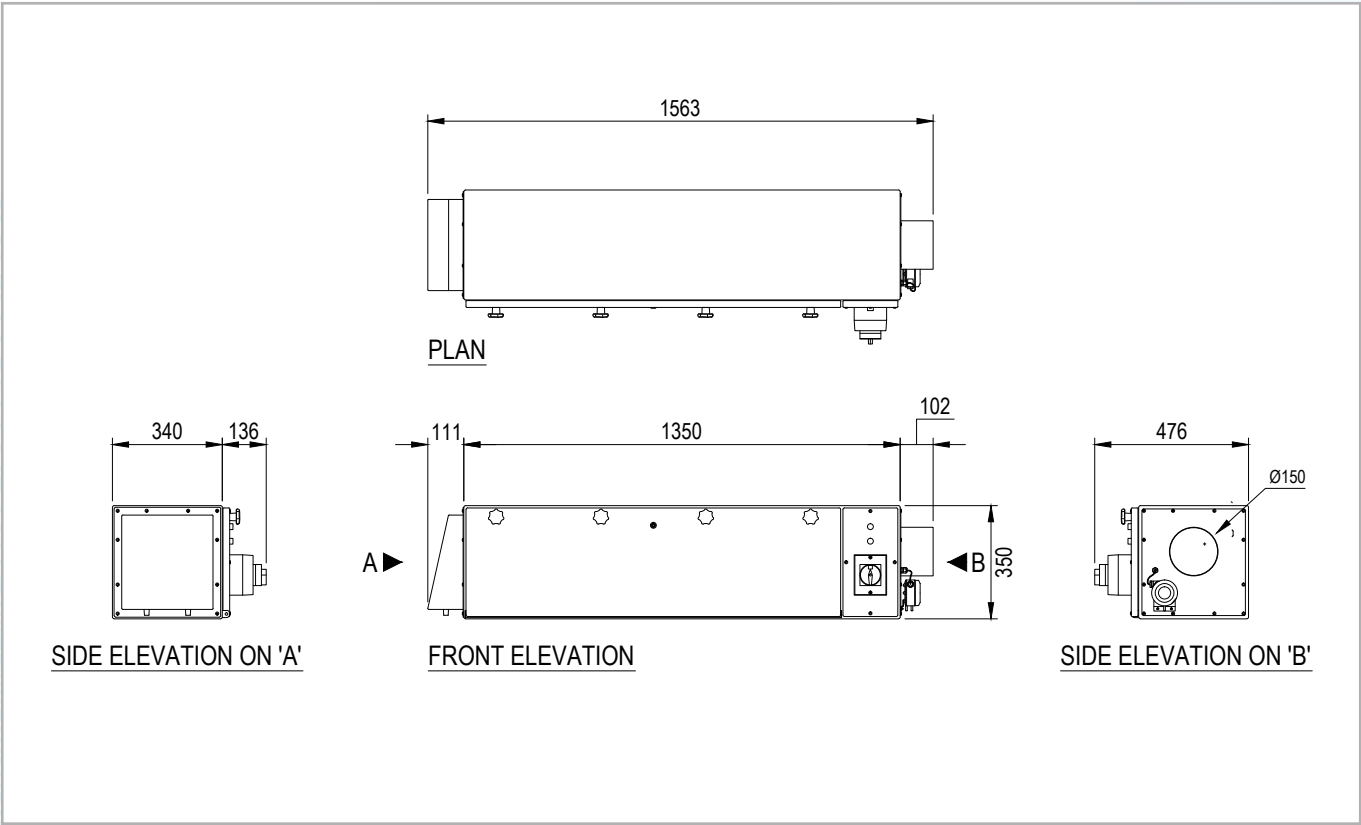
Please note: This equipment needs to be interlocked with the extract fan.

DRAWINGS

UV-O 500



UV-O 1000



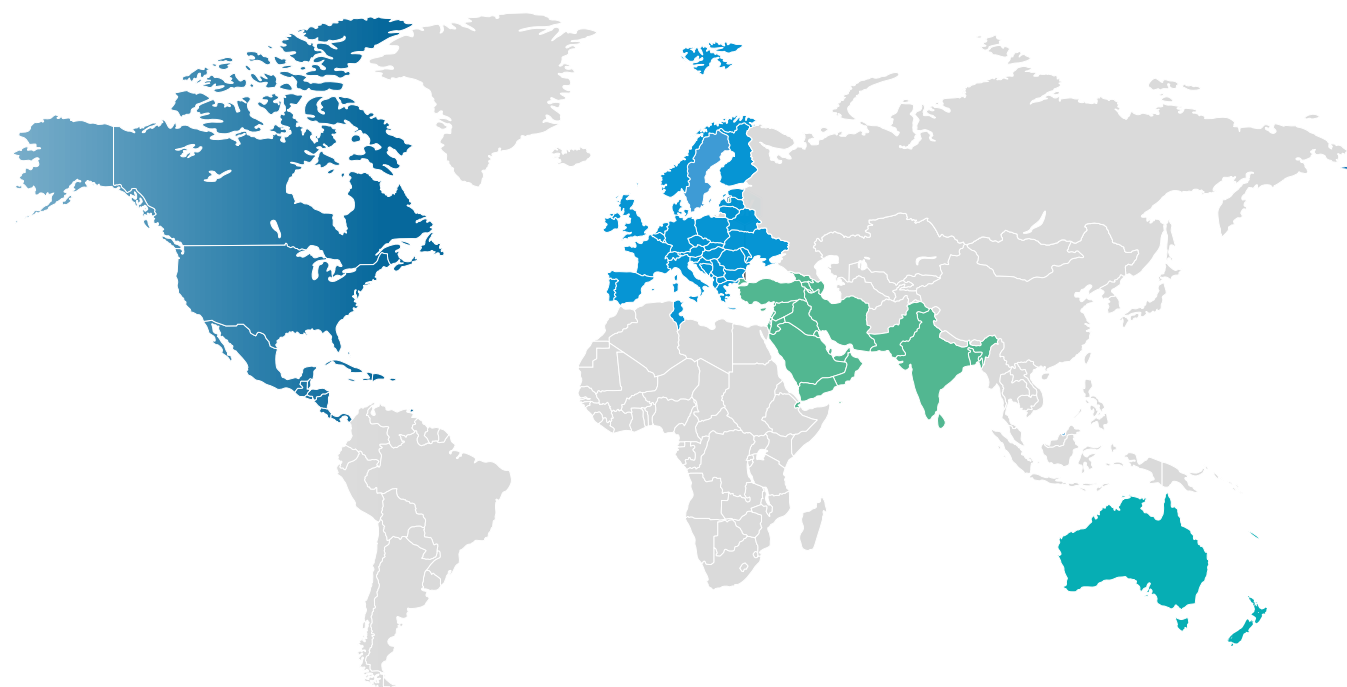
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