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SPECIFICATION DOCUMENT FOR COMMERCIAL KITCHEN EXTRACTION RECIRCULATION SYSTEM

1. Objective

The purpose of this document is to specify the design, performance, and maintenance requirements for a commercial kitchen extraction recirculation system. This system is intended to ensure effective removal of fumes, grease, and odours while maintaining air quality within the kitchen environment and complying with relevant health and safety regulations.

2. SYSTEM DESIGN REQUIREMENTS

2.1 Recirculation System Overview

The recirculation system is designed for kitchens where external exhaust discharge is not feasible or desirable. The system will filter and treat kitchen air, allowing it to be recirculated back into the kitchen environment.

All cooking equipment in the kitchen must operate on electricity. No gas or solid fuel appliances are permitted due to the challenges of adequately filtering combustion by-products (e.g., CO, NOx).

2.2 Filtration and Air Treatment Stages

The recirculation system must include the following stages of air filtration and treatment:

2.2.1 Grease Filtration

Primary Filters: Stainless steel baffle or mesh filters to capture grease particles. Filters must comply with LPS 1263 standards.

Secondary Filters: Electrostatic precipitators (ESP) to further remove fine grease particles from the air stream.

2.2.2 Particulate Filtration

HEPA Filters: High-Efficiency Particulate Air (HEPA) filters with a minimum efficiency of 95% for capturing fine particles and aerosols.

2.2.3 Odour Filtration

Activated Carbon Filters: Carbon filters with a dwell time between 0.4s to 0.8s to adsorb odorous gases. Filters must be bonded and encapsulated to prevent leakage.

UV-C Treatment: An inline UV-C system may be used following the ESP to neutralize odours and microorganisms if being used in a hybrid configuration.

2.3 System Control and Monitoring

Interlocking System: The recirculation system must be interlocked with the electric cooking equipment to ensure that cooking cannot proceed without the recirculation system being fully operational.

Filter Monitoring: The system must include monitoring of filter conditions, preferably with remote access, to ensure timely maintenance and replacement.

Safety Features: The system should include alarms for filter saturation and airflow interruption. UV systems must have safety interlocks to prevent exposure to UV light.

3. Performance Criteria

3.1 Air Quality

Temperature: Ambient temperature within the kitchen should not exceed 25°C. Where the temperature exceeds this level an additional means of air conditioning should be added.

Humidity: Maintain relative humidity between 40-70%.

Air Quality: The recirculated air must comply with occupational exposure limits as set out in HSE publication EH40, particularly for dusts, gases, and VOCs.

3.2 Noise Levels

Internal Noise: The system should maintain internal noise levels between NR40 and NR60.

4. Installation Requirements

4.1 Ductwork and framing

Material: Ductwork / casing must be constructed from stainless steel if situated inside the kitchen, compliant with DW/144 specification.

Access Panels: Access panels must be installed at every 1.5 to 2 meters to facilitate cleaning and maintenance.

Pressure Testing: The ductwork should be pressure tested to DW144 class C to ensure no leaks.

4.2 Fan and Motor Assembly

Fan Placement: The extract fan should be placed in a position to maintain negative pressure throughout the ductwork system.

Motor Position: Motors must be outside the airstream to reduce fire risk, especially when dealing with grease-laden air.

5. Maintenance and Documentation

5.1 Regular Maintenance

Grease Filters: Cleaned every 2 weeks.

Carbon Filters: Replaced every 4-6 months depending on usage.

UV-C Systems: Inspected and cleaned every 4 weeks.

5.2 Documentation

A comprehensive operation and maintenance manual to be provided, detailing maintenance procedures, access locations for cleaning, and a schedule for filter replacement and system checks.

6. Compliance and Certification

The system will be certified to comply with relevant standards including DW/172 for kitchen ventilation, BS 9999 for fire safety, and BESA TR/19 for internal cleanliness.

7. References

DW/172 - Kitchen Ventilation Systems

BESA TR/19 - Internal Cleanliness of Ventilation Systems

BS EN 1856-1 - Chimneys. Requirements for Metal Chimneys

HSE EH40 - Workplace Exposure Limits

EMAQ - Control of Odour and Noise from Commercial Kitchen Exhaust Systems