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A GUIDE TO THE CLEANLINESS OF DUCTWORK SYSTEMS

Aims & Objectives

To introduce the principles of ductwork cleaning and the procedures to be adopted in carrying out this operation.

1. Know the location and understand the importance of access panels for cleaning ductwork

2. State the different methods for cleaning ductwork

3. Understand the hazardous contamination that can occur

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Cleaning & Maintaining Ductwork Systems

Why?

- Ductwork systems must be regularly cleaned and maintained in order to keep the system working efficiently and, most importantly, safely.
- All installed ductwork systems must operate in accordance with DW/144 standards. In order to achieve such high standards, ductwork systems must be cleaned by a specialist cleaning contractor
- The quality of ductwork systems will slowly deteriorate over time and therefore need thorough cleaning. In order to maintain ductwork systems to DW/144 standards, cleaning is vital.
- Ductwork systems that are not cleaned and maintained may breach Health and Safety laws, therefore leading to a high risk of contamination to those who work, operate or play within close proximity.
- Ductwork systems are prone to harbouring certain hazardous contaminants, therefore must abide by COSHH Regulations. Failure to do so will again breach Health and Safety laws.

How?

- Ductwork systems are cleaned via entrance to one of the various access panels located at regular points along the ventilation system.
- All ductwork systems must have these access panels for cleaning and maintenance purposes.
- The following tables show the location and size these access panels must be, in accordance with DW/144 standards.

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Table 1 – location of access panels for cleaning

TYPE	LOCATION
Control Dampers	Both sides
Fire Dampers	One side
Heating/Cooling Coils	Both sides
Attenuators (Rectangular)	Both sides
Attenuators (Circular)	One side
Filter Sections	Both sides
Air Turn Vanes	Both sides
Changes of Direction	One side
In Duct Fans/Devices	Both sides

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Table 2 – size of openings (rectangular & flat oval)

Duct size up to longest side major axis mm	Minimum dimensions of openings mm	
200	300	100
500	400	200
1000	450	450
Duct entry*	600	500

** *Duct Entry – to be determined by local conditions/requirements and may be required in ductwork sizes below 1000mm longest side major axis/diametre

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Table 3 – size of openings (circular)

Duct size up to mm	Minimum dimensions of openings mm	
315	300	100
500	400	200
1000	450	450
Duct Entry*	600	500

*Duct Entry – to be determined by local conditions/requirements and may be required in ductwork sizes below 1000mm longest side major axis/diametre

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Cleaning & Maintenance Frequency

The HVCA's Ventilation Hygiene Working Group have investigated many different methods for 'ventilation system surface condition' testing to establish an objective method for determining when a ventilation system is considered dirty and hence when it would be appropriate to clean.

Two alternative testing methods are recommended as follows:-

- Deposit Thickness Test (D.T.T.)
- Vacuum Test (V.T.)

To establish when it would be considered appropriate to clean a ventilation system, the table below sets guideline maximum levels of surface deposits.

System Type	Surface Contaminant Limits	Test Method
Extract	6g/m2 180 um	V.T. D.T.T.
Re-circulation	1g/m2 60 um	V.T. D.T.T.
Supply	1g/m2 60 um	V.T. D.T.T.

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Dry Cleaning Methods

In most methods, e.g. Air Lance, the particulate should be collected using an air movement and containment machine. This will generally require appropriate filtration and should assist in the containment of contaminants. In smaller hand-based methods, this is not necessary, e.g. Hand Wipe. Examples of dry cleaning methods can be seen opposite.

Generic name	Energy source	Method of removing deposit
Air Whip/Skipper Ball	Compressed Air (Low Volume)	A rubber hose or plastic ball that under pressure agitates the wall of the ductwork
Air Lance	Compressed Air (Low Volume)	Usually an air gun with a trigger that is able to direct compressed air locally
Air Nozzle	Compressed Air (High Volume)	Usually a plastic or metal ball placed on the end of a flexible hose. Compressed air leaving small openings in the ball propels the hose forward inducing the nozzle to closely traverse the internal surface of the duct
Hand Wipe	Manual	Wiping of the surface using a medium appropriate to the purpose
Hand Scrape	Manual	Removing heavy deposits by hand scraping
Hand Brushing	Manual	Brushing the surface using a brush appropriate to the purpose
Hand Vacuum	Electricity/Manual	Suction
Mechanical Brushing	Compressed Air and/or Electricity	Brushing the surface of the ductwork using mechanical action
Mechanical Brush and Air Technology Combined	Compressed Air/ Electricity	Brushing the surface of the ductwork using mechanical action and compressed air

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Wet Cleaning Methods

- The introduction of cleaning chemicals or biocides should only be considered where a risk assessment has been carried out, the details recorded and any adverse effects of the applied chemicals have been assessed and determined with appropriate safe procedures set out in a formal method statement.
- Steam cleaning and high pressure water-wash are not recommended for ductwork that is situated above ceilings or in sensitive areas unless carried out in a controlled manner to contain leakage. Moisture can assist in the growth of micro-organisms and the system should be thoroughly dried prior to commissioning/re-commissioning.
- Careful consideration should be given to the use of chemicals and/or water for surfaces that are porous as permanent damage may result.
- Before applying wet cleaning methods care should be taken to ensure that condensed vapours and cleaning fluids can be removed from the ductwork system.
- The table below provides examples of wet cleaning methods.

Generic name	Method of removing deposit
Wet Vacuum	Suction
Chemical Clean	Softens or dissolves deposits
Hand Wash	Washing of internal surface using appropriate medium
Steam/High Pressure Water Wash	High pressure system used to dislodge/dissolve deposits

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Hazardous Contamination

There are various hazardous contaminants that can be found in ductwork systems. They may include:

- Precipitated toxic, carcinogenic or otherwise particulate
- Condensed Vapours
- Pathogenic micro-organisms

Asbestos

Asbestos presents a variety of possible hazards including:

- Contamination of ventilation system air and surfaces by asbestos fibres
- System construction materials which may be disturbed in gaining access to the system, e.g. cladding or panelling
- Components such as flexible ductwork, flexible connections, gaskets, etc. containing asbestos

Asbestos should only be removed and worked on by licenced specialist contractors.

Specifiers should define any such likely or known hazards in accordance with COSHH.

Regulations and contractors have a duty to satisfy themselves that hazards are known and accounted for.

Specific risk assessments should be carried out and particular method statements provided to deal with hazardous contamination.

Any swab sampling required to meet specific needs should be identified before work commences.

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Completion Report

Having completed cleaning, a completion report should be provided. This should include following information:

- The ventilation system(s) cleaned
- Methods used
- Verification results (if specified)
- Pre- and post-clean photography
- Faults identified that could impact future hygiene
- Any additional works undertaken
- COSHH data on any chemicals used/biocidal treatment
- Recommendations for future testing and cleaning

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