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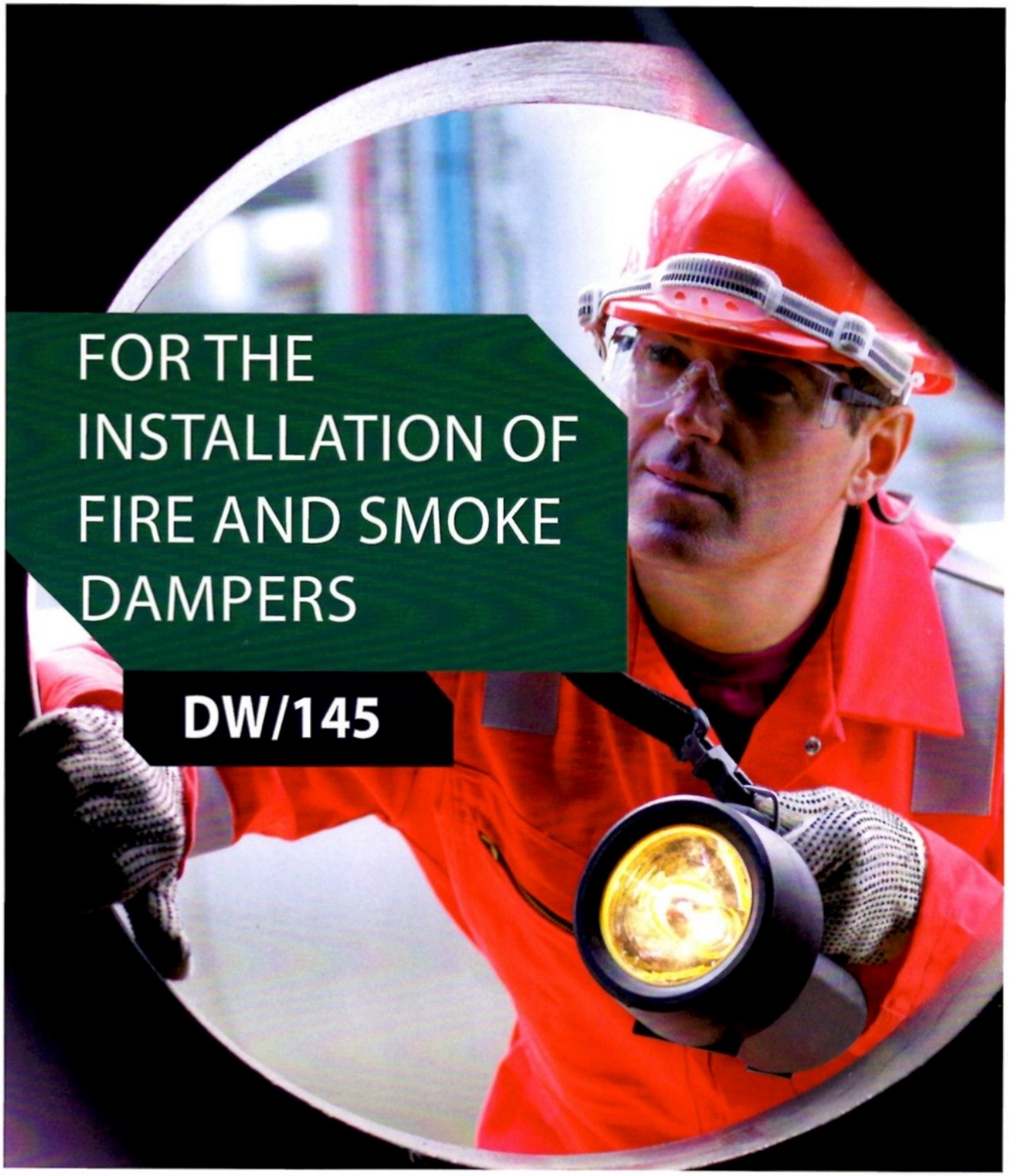
Guide to good practice:



FOR THE INSTALLATION OF FIRE AND SMOKE DAMPERS

DW/145

www.theBESA.com

SECTION 5

Installation

5.0 A successful and compliant damper installation is dependent on three key factors:

- Has the system designer incorporated a damper unit that has been tested by an independent body on behalf of the damper manufacturer as being suitable for the compartment barrier that it is protecting?
- Has the system designer included project specific certified sketches showing the complete installation?
- Has the Principal Contractor, in conjunction with the relevant team members, developed a coordinated installation sequence in the form of a programme?

APPENDIX 'G' offers key guidance points for team members particularly involved in system design and installation and is a useful and quick reference to the overall key points of the guide as a whole.

5.1 Installation arrangements

The system design shall include project-specific certified sketches based on a damper manufacturer's methods which have been successfully tested by an independent body.

Section 6 of this guide provides generic illustrations that cover the majority of installation arrangements in the UK. The illustrations should only be used for guidance and planning purposes. The project-specific sketches in the system design showing the complete installation arrangement shall always over-ride any illustrations shown in this or any other guide or specification.

5.2 Information to be provided to the damper installer

In addition to the information listed in Clause 4.3 and G.3.1, and to ensure that all the relevant information is made available to the damper installer, it is recommended that a check list is compiled which is based on proven information and procedures successfully used on previous projects. A typical check list is provided in **APPENDIX 'E.2'**

5.3 Sequence of installation

On receipt of the project-specific certified sketches (detailing the damper arrangement in the compartmentation barrier that it protects), it will be necessary for the designated principal contractor to establish a coordinated programme for the installation sequence for the barrier, the damper, the ductwork and the penetration seal. **APPENDIX 'F'** indicates typical activity sequences to suit the agreed order of installation.

5.4 Installation considerations

For a cost efficient and successful installation, it needs to be recognised that issues can occur and that they should be overcome with the continued involvement of the CDM Coordinator. The team as a whole have the responsibility of addressing and resolving unexpected issues and ensuring that work-in-progress inspections are conducted to ensure that a final inspection before handover to either the commissioning team or the client will not result in any corrective action having to be instigated.

5.4.1 On-site modifications

During installation, issues can arise that might need either a revised or 'non-standard' solution. They should only be introduced by the system designer who may need to take advice from other members of the team including the damper manufacturer and/or a fire safety engineer. It may also be necessary for Building Control and/ or the local Fire Authority to be involved.

Where site conditions differ from those tested, the building control authorities must consider what test evidence is available and reach a conclusion. Simply requesting a damper manufacturers' approval is unacceptable, as in most cases this may not be given as assessments may not be available (see

4.2.3)

5.4.2 Work-in-progress inspections

The CDM coordinator must monitor compliance with the project-specific design and ensure that the work-in-progress is regularly inspected in accordance with the installers approved method statement and the system design.

5.4.3 Pre-handover activities

It is in the interest of the whole team that pre-handover inspections by the damper installer and the hand-over itself are based on an agreed check list. A typical Inspection and Handover Check List can be found in **APPENDIX 'E.3'**

On completion of the works, the team member carrying out the damper installation must ensure that:–

5.4.3.1 Dampers are internally clean and free from damage.

5.4.3.2 Dampers continue to operate after installation and can be reset from the access provided.

5.4.3.3 All internal and external control devices are in good condition and accessible.

5.4.3.4 Terminals on connections to control systems are accessible.

Following the checks the damper(s) must be offered for inspection by the agreed parties.

5.4.4 Final inspection and certification

At the outset of their involvement, all team members must be made aware of the intended final inspection and certification regime. The final installation must be checked for compliance by the CDM coordinator. The completed installation forms part of the building's life support strategy and nothing must be left to chance with every aspect of the installation being checked against the project-specific certified sketches included in the system design.

All final inspections must be documented in a handover register that must be retained by members of the team responsible for system design and installation.

A typical Inspection and Handover Check List can be found in **APPENDIX 'E.3'**

SECTION 6

Typical Damper/Barrier Installation Arrangements

Ensure that the selected fire damper has the required classification and that it can be incorporated into an installation arrangement that can be supported by the individual fire damper manufacturer's test data. Methods are not interchangeable between manufacturers. Test or assessments are required for different fire damper models, which, in turn, may have different installation methods available with regard to E and/or ES classifications.

The typical damper/barrier installation arrangements listed below cover the vast majority of damper installations common in the UK.

Methods 1 and 2 are the preferred methods for use with pre-formed openings.

- **Method 1**
  Pre-formed vertical or horizontal opening complete with damper sleeve and blades **out** of the airstream
- **Method 2**
  Pre-formed vertical or horizontal opening complete with damper sleeve and blades **in** the airstream
- **Method 3**
  Pre-formed vertical or horizontal structural / builders work opening complete with damper expansion frames
- **Method 4**
  Pre-formed vertical opening in a dry-lining partition complete with damper faceplate
- **Method 5**
  Damper and ductwork installed prior to the forming of a dry-lining partition
- **Method 6**
  Damper installed in a vertical fire curtain
- **Method 7**
  Surface mounted damper on pre-formed vertical or horizontal builders work / structural opening using a sheet metal 'Z'-frame

The methods and illustrations on the following pages are provided for guidance and planning purposes only; the project-specific certified sketches in the system design showing the complete installation will over-ride any illustrations shown in this or any other guide or specification.

The lack of detailed dimensional information on the illustrations in this guide reflects the fact that only the project-specific sketches can contain such detailed information.

Although the illustrations that follow relate to rectangular ductwork applications, the arrangements equally apply to both circular and flat oval damper / ductwork applications. As stated in the illustration headings, some arrangements can be utilised in horizontal structural openings.

Appendix B

Definition of Damper Types and a Glossary of Terms

B.1 Definitions

For Industry consistency, all definitions of commonly used dampers relate to those published in the ASFP Grey Book of which the BESA were co-authors.

B.1.1 Curtain Fire Dampers

Folding curtain fire dampers are constructed of a series of interlocking blades which fold to the top of the assembly permitting the maximum free area in the airway. The blades are held open by means of a thermal release mechanism. When the release mechanism is activated the blades fall, or are sprung, to fill the airway to prevent the passage of the fire

B.1.2 Single Blade Fire Dampers

Single blade fire dampers are constructed with a single pivoting blade within a frame. The blade is released from its open position by means of a thermal release mechanism. When the release mechanism is activated the blade pivot moves to close the airway to prevent the passage fire.

B.1.3 Multi-blade Fire Dampers

Multi-blade fire dampers are constructed with a number of linked pivoting blades contained within a frame. The blades are released from their open position by means of a thermal release mechanism. When the release mechanism is activated the blades pivot and move to close the airway to prevent the passage of fire

B.1.4 Multi-section Fire Dampers

Where the duct exceeds the maximum tested size of an individual damper (or single section), manufacturers may provide multi-section units. These will generally be supplied with some type of joining strip or mullion to allow the unit to be assembled on site. This joining is not, necessarily, structural. Consideration shall be given by installers for additional support, particularly on larger multi-section units.

B.1.5 Combination Smoke and Fire Damper

These units are fire dampers as generally described in previous sections but would also expect to be actuated in some way to respond to a remote signal in the case of a smoke alarm to prevent the passage of cold smoke.

B.1.6 Smoke Control Damper

Smoke control dampers, which are not covered in this guide, are single or multi-blade dampers that would generally have two safety positions – 'open' to allow smoke extraction or 'closed' to maintain compartmentation. They do not have a thermal release mechanism, relying on a 'powered' control system to ensure that they achieve the correct position. Volume 2 of the 2nd Edition of the ASFP's Grey Book will cover 'powered' smoke control dampers in detail.

B.1.7 Insulated Fire Damper Blades and Closures

Fire dampers where the blades not only satisfy the appropriate integrity/leakage requirements but also show insulation characteristics when tested.

B.1.8 Intumescent Fire Resisting Damper

Intumescent fire dampers incorporate components, which expand by intumescent activity under the action of heat, to close the airway to prevent the passage of fire. The intumescent materials form the main component for fire integrity. In some instances this may be supported with a mechanical device to prevent cold smoke leakage.

Activation temperatures will be influenced by the type of intumescent material. Some intumescent dampers, whilst containing fire and hot smoke, also incorporate an electro-mechanical device that provides cold smoke containment by interface with smoke sensors via a fire alarm panel.

B.2 Glossary of terms

In order to appreciate the terminology used in the design and specification of dampers, commonly used terms are listed below, in alphabetical order, and again, for consistency, these terms align to those published in the ASFP Grey Book

B.2.1 Assessments

Documents from independent accredited bodies providing broad ranges of application based on a range of fire test data. Products and systems may only be used in applications covered in the range of the assessment. See **APPENDIX 'H'** for a current list of Fire Testing and Assessment Bodies and also Section 1.0, Scope, on the validity of assessments.

B.2.2 Break-away duct joint

A joint connecting a fire damper spigot or sleeve to the attached ductwork which will allow collapse of the ductwork during a fire without disturbing the integrity of the fire damper. 'Break-away' and flexible joints incorporate materials, fixings, clamps, etc, that are manufactured from a non - fire resistant material with a low melting point such as aluminium, plastic, etc.

B.2.3 Expert Judgments (EJ)

Solutions to specific technical problems that may lie outside that for which it would be considered reasonable to have test data. They shall only be issued by competent persons and covered by appropriate guidelines. Products and systems may only be used in applications covered within the scope of the EJ which usually means for a single application. If there is any doubt that a third party (notified body) would be unable to arrive at the same conclusion an EJ shall not be made.

B.2.4 Expansion Frame

A factory fitted installation frame supplied by the damper manufacturer that forms a complete assembly with the appropriate damper fitted therein. This frame allows the damper to expand under fire conditions and be to a design which has been successfully fire tested. A HEVAC/BESA frame (DW/144, fig 78) as illustrated in Method 3, can be regarded as falling within this definition however, particular attention must be paid to the individual fire damper manufacturer's data and fixing instructions particularly relating to the positive fixing of the building ties. Failure to do so may result in a non-compliant installation.

B.2.5 Fire Separating Element/ Barrier

Floors, walls, partitions and other fire separating elements of construction having a period of fire resistance as determined in accordance with BS 476 Parts 20, 21 and 22 or the relevant European Standard. NB! Whilst the term 'Fire Barrier' is the Industry preferred terminology, the technically correct reference is 'Fire Separating Element' which obviously covers floors in addition to walls, partitions and curtains.

B.2.6 Fire damper sleeve

An enclosure surrounding a fire damper, in an air passage penetrating a fire rated barrier mounted in such a manner that disruption of attached ductwork, if any, will not impair operation of the damper.

B.2.7 Fire-stop

A 'gap' seal provided to close an imperfection of fit or design tolerance between elements or components to restrict the passage of fire and smoke.

B.2.8 Penetration

An aperture through a fire barrier, e.g. an aperture for the passage of a ventilation duct or ductwork.

B.2.9 Penetration Seal

The system used to restore and maintain the fire classification of the fire separating element / barrier at the position where the damper / ductwork pass through the barrier.

B.2.10 Performance criteria for Integrity (E), Insulation (I) and Leakage (S)

The definition of the three elements of the performance criteria of dampers tested to BS EN 1366-2 (1999) are:

Integrity (E)

After the start of the fire test, the leakage through the fire damper must not exceed 360m³/h/m²) (corrected to 20°C). The integrity around the perimeter of the fire damper must continue to maintain its separating function during the test without either

a) causing the ignition of a cotton pad
b) permitting a penetration of a gap gauge
c) resulting in sustained flaming

Insulation (I)

This is the time in completed minutes for which the fire damper continues to maintain its separating function during the test without developing temperatures on its unexposed surface for which either

a) increase the average temperature above the initial average temperature by more than 140°C or
b) increase at any location (including the roving thermocouple) above the initial average temperature by more than 180°C.

Leakage (S)

Leakage through a fire damper must not exceed 200m³/h/m² (corrected to 20°C). The requirement for leakage during the ambient leakage test need not be met after 5 minutes test duration.

Note!

The result of the fire test must be stated in terms of time elapsed to the completed minute from the commencement of the heating to the time when the fire damper failed to satisfy the criteria for integrity, insulation or leakage, or the termination of the heating, whichever is the shortest.

B.2.11 Support system

The components used for suspending and/or fixing a damper assembly to either the fire barrier itself or an adjacent floor, wall or soffit.

B.2.12 Test Evidence

Data obtained from a fire resistance test carried out to determine the suitability of a product, system or combinations to seal service penetrations. With respect to fire dampers this will be to BS EN 1366-2 with classification to BS EN 13501-3. Historical data to BS476-20/22 will only be applicable in certain instances (e.g. fan shut-down on detection of fire) see Approved document B: Fire safety Tests to be undertaken by an UKAS (**United Kingdom Accreditation Service**) accredited laboratory or equivalent.

Appendix E

Design, Installation, Inspection and Handover Check Lists

Communications between team members and the need for consistency in both design and approach are key factors in achieving a compliant design. It is recommended that check lists are utilised and adapted to suit the specific requirements of an individual project. Typical check lists for design, installation and inspection / handover are included in this appendix.

Note! Copies of the three typical tabulated checklists on the following pages are available from the BESA website and are titled as follows:

E.1 Design check list

As stated previously, the system design process as a whole involves many considerations some of which vary depending on project-specific factors such as barrier type, installation sequence, space (both for installation and future maintenance), other services, etc. Every effort shall be made to ensure no critical factors are overlooked. To assist in this it is advisable to work to a check list which is regularly updated by drawing on experience gained from previous projects.

E.2 Installation check list

This check list covers the practical installation considerations to be addressed to ensure that project-specific design criteria are fulfilled

NOTE! Refer to **APPENDIX 'B'**, Clause B.2.3 on the subject of 'Expert Judgments' (EJ's) which explains valid reasons for addressing and resolving a recognised technical problem that has not been covered by any technical data or formal design instructions.

E.3 Inspection and handover check list

Having established that all parties must be made aware of the intended final inspection and certification regime, the final installation must be checked for compliance by the nominated CDM coordinator or the System Designer. The completed installation forms part of the building's life support strategy and nothing must be left to chance with every aspect of the installation being checked against the system designers project-specific certified sketches. All final inspections must be documented in a register that must be retained by both the system designer and the installation contractor. See 5.4.3 and 5.4.4 for more detailed guidance.

E.1 Design Check List

No.	Question	Guidelines	Responsibility
01	What evidence of compliance with the latest Building Regulations is available for the selected damper installation method?	Damper manufacturer must provide evidence that the installation method meets with Building Regs.	System Designer.
02	What damper fire classification is required? Do the system design drawings have dampers marked with identification codes which cross reference back to a schedule of all dampers that includes their rating and location?	Each damper must meet the same minimum fire classification as all other system components	System Designer.
03	Into what substrate is the damper to be installed?	Wall or Floor?	Architect / Client.
04	From what is the substrate constructed?	Concrete, blockwork, dry-lining, etc	Architect / Client.
05	Is the damper frame / support compatible with the substrate type and intended installation method?	This is fundamental to a successful installation.	System Designer.
06	Has the damper manufacturer been consulted as to the most appropriate type and layout of dampers?		System Designer.
07	Is the method tested and approved for the type of barrier that is being protected?	Assemblies for block work walls may not be suitable for dry-lining barriers	Damper purchaser And manufacturer
08	How is the damper to be independently supported from the connecting ductwork?	Include guidance on the use of break away joints.	System Designer.
09	Can the intended installation be completed within the boundaries of the construction programme?	In dry-lining, openings must be accurately planned and set out in advance. It is difficult and expensive to form openings to tested standards after walls have been built	Lead Contractor.
10	Have methods of retro-fitting dampers which have been missed or modified been agreed?	Retro-fitting dampers in partitions is difficult.	System Designer.
11	Has sufficient room been allowed for building-in dampers when the entire ductwork, nearby walls, ceilings and services are installed?		System Designer.
12	Has a fire-stopping contractor been consulted prior to design completion to advise on whether a tested solution is available for the circumstances on site?		System Designer.
13	Has the fire-stopping manufacturer provided evidence to support the tested solution?		System Designer.
14	Does the fire-stopping test evidence relate to the actual application with appreciation of the wall type, the damper type and the frame type?		System Designer.
15	Will the fire-stopping manufacturer be on site to provide guidance and training during installation?		System Designer.
16	Are load bearing supports needed for vertical ducts		System Designer.
17	Is the installation of the builders work between damper frame and wall to be carried out by a suitably qualified and approved third party installer?		Lead Contractor
18	Have materials or insulation of a combustible nature been excluded from the duct within 500mm of a damper?		System Designer.
19	Has adequate space been provided allow for access to dampers for maintenance and testing purposes?	Consider access on both sides of the damper for both maintenance and future cleaning purposes.	System Designer.
20	Has pre-installation meeting been planned between the system designer, site management team, Building Control Body / Fire Authority, duct/damper installer, barrier subcontractor and manufacturers of drywall, damper and fire-stopping systems?	This is essential	Lead Contractor

E.2 Installation Check List

No.	Question	Guidelines	Responsibility
01	Has all the necessary technical information been made available for the damper installer and all other associated trades?	Refer to Clause 4.3	System Designer
02	Has a project-specific programme of sequenced installation activities been prepared?	An acceptable sequence to achieve the same design criteria can vary from project to project	Lead Contractor.
03	Does the programme sequence of other trades allow for there being sufficient space on all four sides of the damper to fit associated support systems, apply fixings and to complete the penetration seals	Inaccessible voids and cavities caused by adjacent walls, columns and structural soffits shall be considered during programming.	Lead Contractor.
04	Does the programme sequence ensure that there are no other services installed that would prevent the damper arrangement being fitted as per the system design?	Other trades cannot 'share' the openings for dampers and their penetration seals.	Lead Contractor.
05	Does the programme sequence ensure that there are no ceiling grids / tiles installed that would prevent ease of installation for all associated contractors?		Lead Contractor
06	Have solutions to any necessary on-site change to the installation sequence been transmitted back to the programmer so that future projects will benefit?	Altering the sequence of one or more contractors in order to achieve the design in a more practical manner shall be communicated back to the programmer for use on future projects.	Damper installer, Barrier contractor, Penetration seal contractor.
07	Has the system designer approved any ad-hoc instructions issued by a third party? e.g. The 'ad-hoc' insertion of stone mineral wool, or similar, in cavities	The inclusion of non-specified products, material and dimensional modifications may result in the invalidity of the final assembly	Damper installer, Barrier contractor, Penetration seal contractor.
08	Is the method tested and approved for the type of barrier that is being protected?	Assemblies associated with block work may not be suitable for dry-lining	Damper Purchaser Damper Manuf'cter
09	Is the opening in the dry-lined barrier correctly formed, trimmed and lined?	Do trimming members need to be tied back to the soffit and slab?	Barrier Contractor.
10	Prior to installation are method statements, COSHH assessments and risk assessments available to the installers?	The availability of clear instructions to the installers is essential in ensuring correct installation methods are adopted.	Damper installer, Barrier contractor, Penetration seal contractor.
11	Has the damper, duct and penetration seal been installed as per the specification?	Query before installation if any element appears to be non-compliant	All parties.
12	Has adequate space been provided to allow for access to the damper for maintenance and testing purposes?	Consider access on both sides of the damper for both maintenance and future cleaning purposes.	System Designer.

E.3 Inspection and Handover Check List

No.	Question	Guidelines	Responsibility
01	Are the dampers the correct type?	Confirm the damper is the correct type i.e. Fire, Fire/Smoke, Curtain type, Single/Multi Blade type, etc.	System Designer.
02	Are the dampers correctly identified?	Any unique system identification or plant item number must be clearly indicated on the damper or agreed location.	System Designer or Commissioning Engineer
03	Are the dampers located correctly?	The damper position shall be dimensionally checked against the installation drawings / details.	Damper Installer.
04	Have supports for both the damper and adjacent ductwork been installed in accordance with the approved method?		Damper Installer.
05	Are the dampers fitted in the correct orientation?	Is damper installed the correct way up and relative to airflow / access?	Damper Installer.
06	Is access, through the ductwork, to the damper unobstructed?	Unobstructed space shall be provided for safe access to damper. Also consider access through ceiling voids and adjacent services.	Damper Installer to advise System Designer if problems are foreseen.
07	Has the space around the damper, and within the penetration, been left clear and not been used for the passage of other services?	The presence of other services will invalidate the installation method.	Damper Installer to advise Lead Contractor if problems are foreseen.
08	Using the access opening provided, has the damper been left in the open position?		Damper Installer.
09	Has the dampers blade catch been released to simulate failure of thermal release mechanism (damper 'drop test').	Ensure blade operation is free from interference.	Damper Installer.
10	Has the damper been checked for internal cleanliness and freedom from damage? Are vertical casings in particular free from debris?	With the damper in the closed position inspection for damage.	Damper Installer.
11	Have the dampers blades been re-set following the drop test and the access panel replaced?	After re-setting the damper blades, check position shown on blade position indicator is correct.	Damper Installer.
12	At the time of the damper handover, is the fire barrier and penetration seal complete?	Damper installer to record, on the handover register, if any following trades have still to complete their activities.	Damper Installer.
13	Is the damper installation completed and available for handover prior to system commissioning?	Obtain relevant acceptance of the damper installation from the CDM coordinator	Damper Installer.
14	Is the completed handover register cross referenced back to the identification codes listed in the system designer's damper schedule?		Damper Installer.

Appendix G

Key guidance points for the system designer and the damper installation contractor

The purpose of this appendix is to provide a quick reference to the key points of DW/145 which shall be considered by the system designer and the damper installation contractor and their on-site fitter. System designers, depending on individual contractual responsibilities, may be either building services consultants, mechanical services contractors or, in the case of 'design and supply' projects, ductwork contractors.

References in this appendix to the 'design office' relates to the source of the system design be it any one of the three parties referred to in the previous paragraph.

Much of the information in this appendix is ideal for training purposes both off-site for those involved in the design office and on-site for the damper fitter. Section G.4 presents the key points in a simplified format which can be used as a refresher training guide or a simple *'aide memoir'*. A copy of this appendix in a format that that can be easily carried and referenced by the damper fitter is available from the BESA website.

G.1 Responsibilities

Damper installations are a critical element of a building's life safety strategy. The initial responsibility for ensuring a compliant installation lies with the design office and the final responsibility with the on-site fitter. It is essential that lines of communication are formally established between the parties and, when appropriate, that the CDM coordinator monitors and progresses such communications. Failure by either party in not recognising and working to formal design parameters may result in serious consequences especially if, during a fire insurance claim, it can be proven that any party has acted in a negligent manner. Dampers are not just installed to minimise fire and smoke damage to the fabric and contents of a building but, more importantly, they are there to save lives.

G.2 The design office.

Parties responsible for the ductwork and damper design shall familiarise themselves with the full contents of DW/145 and not just this appendix and its recommendations.

G.2.1 Selecting the appropriate damper

By using a damper catalogue or contacting the manufacturers directly, select an appropriate damper. If the information obtained does not clearly reflect the conditions that are expected on site then discuss with the damper manufacturer the best option(s) that they can provide which they are prepared to endorse and satisfy the need to only provide dampers and methods of installation that have been fire tested. Evidence must be made available that the method has been fire tested by a UKAS accredited laboratory or equivalent.

Damper manufacturers will provide dimensionally detailed guidance on how the damper is to be installed **including any requirements for damper assembly expansion**. It must also be ensured that the method specified is practical relative to the site conditions that exist for the project.

Once selected, it is imperative that only the damper manufacturer's model of damper and the agreed method of installation are used. Failure to adhere to the agreed methods will invalidate any responsibility on the part of the damper manufacturer **including using another manufacturer's similar product without approval**. It is not an option to simply purchase a similar unit from a third party stockist; this would be a change in the design and therefore a breach of the CDM Regulations.

G.2.2 Spatial coordination

Using the contract issue drawings, the design office must make provision for sufficient space and access not only to

enable the damper fitter and follow-on trades to install the complete damper arrangement, but also to allow both handover and future maintenance activities to be performed.

G.2.3 Project specific sketches

Having selected an appropriate damper, it is necessary to incorporate this information into a project specific sketch which shall include the detailed information required by the fitter as listed in Clause G.3.1 of this appendix.

G.2.4 Installation sequence

The design office must liaise with the designated principal contractor and any specialist contractors involved in ensuring that a practical sequence is established that allows all parties to complete each element of the installation, i.e. the damper, the barrier, the penetration seal and the ductwork connections.

G.3 The damper fitter

In addition to working to the project-specific information provided by either the design office or their installation supervisor, the damper fitter not only has a responsibility to comply with that information **without deviation** but they also have a responsibility to undertake the pre-handover checks. (See G.3.3)

G.3.1 Information to be provided to the damper fitter

It is not an acceptable practice for the damper fitter to be expected to follow the custom and practice adopted on previous unrelated projects. The following information must always be provided by the design office:

G.3.1.1 Project-specific detailed and dimensioned arrangements incorporating the compartment barrier, the damper and the penetration seal.

G.3.1.2 Manufacturer's details for incorporating any expansion allowance including, where appropriate, damper unit expansion frames.

G.3.1.3 Damper to ductwork connection details including any specific requirements for fixings, joints, breakaway joints, fastenings, etc.

G.3.1.4 In addition to indicating the supporting method for the damper, it is important that the dimensional location of the first ductwork support relative to the damper centreline or face is indicated – for both sides of the damper.

G.3.1.5 If not already incorporated into the connecting ductwork in the factory, the position of (a) an access cover that is free of obstructions and on the appropriate side of the barrier for blade testing, re-setting and maintenance, and (b), if necessary, a second access cover on the opposite side of the barrier that may be called for by the ductwork cleaning specification.

G.3.1.6 A programme clearly detailing the sequence of installation relative to each activity.

G.3.1.7 Inspection and handover requirements to be witnessed and recorded in the handover register.

G.3.1.8 Any other requirements.

G.3.2 Responsibilities of the damper fitter

It is imperative that the damper fitter reports back to the design office any activity that may arise on site that could cause the damper arrangement to be non-compliant.

G.3.2.1 If the damper fitter has been requested to deviate from any of the information provided in G.3.1 without formal instruction being provided by an authorised party involved in the damper arrangement, the installation supervisor must refer such matters to the design office for acceptance before acting on the request.

G.3.2.2 It is recommended that the damper fitter checks the operation of the damper **before** installing so that any malfunction can be corrected. NB! If the damper fitter has been requested by an authorised party to substitute a damper from a different manufacturer to that specified, this request must be approved by the design office as such a substitution should only be undertaken with the system designer's consent.

G.3.2.3 If an issue arises relating to prevailing site conditions with regard to space and access, the situation must be referred to the design office who in turn, with the entire test evidence available, take the problem, via the CDM coordinator, to the damper manufacturer and the building control authorities in order that a practical solution can be agreed.

G.3.2.4 If requested to fit stone mineral wool, or similar, in any expansion gap which is not a specified requirement of the project-specific information that the damper fitter has been provided with, the request must be referred to the design office. Such additions could render a damper inoperable or compromise the function for which the damper was installed.

G.3.2.5 The design office must be informed if a pre-formed dry-lining barrier opening has not been pre-framed and, if necessary, lined and does not appear to be fixed to the soffit / slab. It is not sufficient for a 'raw' opening to be simply cut into the barrier. A clear indication that an opening is not satisfactory is if the barrier itself is unstable before the installation of the damper assembly.

G.3.2.6 If before installing the damper and / or duct connections, it becomes apparent there will be in-sufficient access around all sides of the damper assembly, on both sides of the barrier, to either fit the damper support system or to complete the penetration seal then, via the design office, the affected party needs to be consulted as an installation sequence change may need to be introduced.

G.3.3 Pre-handover checks by the damper fitter

Prior to handing over the damper to the designated party, the damper fitter, in conjunction with the installation supervisor, must carry out the following checks to ensure that the installation is compliant:

G.3.3.1 Dampers are internally clean and free from damage.

G.3.3.2 Dampers continue to operate after installation and can be reset from the access provided.

G.3.3.3 All internal and external control devices are accessible and in good condition.

G.3.3.4 Terminals on connections to control systems are accessible.

G.3.3.5 Dampers are installed the correct way up relative to airflow and access.

G.3.3.6 Confirm the damper has been left in the open position.

G.3.3.7 Release the damper blade catch or mechanism to simulate failure of the thermal release mechanism, i.e. a damper drop test.

G.3.3.8 If the barrier is to be built after the installation of the damper arrangement, ensure that dampers fitted with expansion frames have their building ties bent out prior to the application of the penetration seal.

G.3.4 Inspection and handover by the damper fitter

In conjunction with the design office, either the damper fitter or the installation supervisor needs to formally hand over the installation for final inspection by the CDM coordinator. All final inspections must be documented and recorded in a register that is retained by all interested parties which must include the identification details of the CDM coordinator who has witnessed any tests and taken over the damper arrangement.

G.3.4.1 Undertake a witnessed test that confirms the damper mechanism performed satisfactorily and can be reset from the access provided. NB! The need for 'man access' to re-set a damper is a critical factor especially if it at a later date non-related 'obstructions' have been fitted by other parties after handover which restrict this critical operation.

G.3.4.2 Following the handover event, the register records must include the following information:

- Damper reference number (identified relative to contract drawings)
- Date
- Witness's name in both **printed** and signature form.
- Activities which are incomplete at the time of handover, i.e. ductwork connections, compartment barrier and penetration seals. NB! This is essential especially if it is found that the eventually completed installation is not compliant and remedial actions are required.

G.4 Key considerations – a Summary

System Design office

- Only use damper manufacturers who can provide evidence that the installation method has been fire tested by a UKAS accredited laboratory or equivalent.
- If site conditions do not permit the use of a damper manufacturer's particular installation method, discuss and agree with them alternative methods that they are prepared to endorse.
- Prepare detailed drawings of the complete arrangement (damper, fire barrier / slab and penetration seal) and gain client's approval.
- Agree an installation sequence with all involved parties that takes into consideration spatial availability and which allows them to complete their element of a compliant arrangement.
- Prepare a handover register for use by the damper fitter.

Damper fitter (or their installation supervisor)

- Only use the method illustrated in the project-specific information.
- Never revert to methods used on a previous project unless approved by the design team.
- Expansion allowance will have been incorporated into the contract drawings – it must not be ignored.

- Before installation, check that the damper is free from damage and operates correctly and that it is the unit specified on the contract drawings.
- Do not use substitute dampers.
- If a problem arises that is outside your control and which may result in a non-compliant installation, report the situation back to the design office.
- If the compartment barrier (wall or slab) is not formed or finished-off as per the contract drawings, report the situation back to the design office.
- During installation, ensure that the damper is fitted to suit the airflow direction and that it is not upside down.
- After installation, check that the damper is clean and free from damage.
- Connecting ducts must only be fitted to suit the agreed installation sequence of all involved parties.
- Fixings, cleats, duct supports, etc, must only be fitted in accordance with the contract drawings and a note must be made of the specified type of fixing and, in particular, it's material. Some similar but totally different fixings such as mechanically closed rivets may be, **by design**, manufactured from either steel or an aluminium alloy
- Prior to handover, ensure that the damper blades can be accessed and re-set via the access panels in the adjacent ductwork connections.
- Ensure that the appropriate information is recorded in the handover register.

Appendix H

UKAS fire certification bodies

BRE Global Ltd (incorporating the Loss Prevention Certification Board, LPCB)
BRE, Bucknalls Lane, Watford, Herts, WD25 9XX
Tel: +44 (0)1923 664 100
Email: enquiries@breglobal.com
Web link: http://www.redbooklive.com

Chiltern International Fire
Stocking Lane, Hughenden Valley, High Wycombe, Bucks HP14 4ND
Tel: +44 (0) 1494 569 800
Email: cif@chilternfire.co.uk
Web link: http://www.chilternfire.co.uk

FM Approvals Limited
1 Windsor Dials, Arthur Road, Windsor, Berkshire, SL4 1RS
Tel: +44 (0)1753 750 000
Email: cpd@fmapprovals.com
Web link: http://www.fmapprovals.com

International Fire Consultants Ltd
20 Park Street, Princes Risborough, Buckinghamshire, HP27 9AH.
Tel: + 44 (0)1844 275 500
Email: ifc@intfire.com
Web link: http://www.intfire.com

Warrington Certification Ltd
Holmesfield Road, Warrington, Cheshire WA1 2DS
Tel: +44 (0) 1925 646 777
Email: info@warringtonfire.net
Web link: http://www.warringtonfire.net and http://www.bodycote.com