National Association of Air Duct Specialists UK

NAAD UK
National Association of Air Duct Specialists UK

1st Edition
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# Fire Dampers

## Part 1:
## Routine Maintenance, Testing & Inspection

## Part 2:
## Installation, Testing & Commissioning

## Part 3:
## Design for and Selection of Fire Dampers

NAAD-22

ADCAS
THE VOICE OF THE DUCTWORK INDUSTRY

# NAADUK
# National Association of Air Duct Specialists UK

## Foreword

The National Association of Air Duct Specialists UK (**NAADUK**) was formed in 2017. It was founded by a collective of ventilation hygiene specialists, individuals and companies who are experienced and knowledgeable within the industry of ventilation and air conditioning. Many of these experts have over three decades of knowledge.

All members of **NAADUK** are IAQ technicians and/or Fire Damper Inspectors who have passed a **NAADUK** approved training course and are listed on the **NAADUK** register. This enables the public or clients to find a reputable and competent technician easily from the website.

**NAADUK**'s objective is to improve industry standards in ventilation hygiene and fire dampers to facilitate communications between its members, other likeminded associations and awarding bodies.

**NAADUK** hold regular meetings, ensuring that discussions are current and up to date, with topics focusing around fire dampers maintenance, the importance of cleaning techniques and frequencies.

***NAADUK vision for the future: -***

1. *Collaboration between other organisations, associations and manufacturers.*
2. *Competency and standard of cleaning to current regulations and standards.*
3. *Improving technology and methodology.*
4. *Investigating and improving best practice.*
5. *Improving the health of the nation within the working environment - in particular improving IAQ and fire safety.*
6. *Raising awareness of ventilation hygiene and fire safety to the general public, building owners, companies and clients and their responsibilities under RRFSO 2005.*

The purpose of this guidance document is to inform, educate and improve standards for fire dampers and smoke dampers, across all sections and types of buildings in the UK.

**NAADUK** believe this document will contribute to a safer and healthier environment for all. Many of the guidelines, standards and regulations developed by the various associations concerned have contributed greatly to our increased safety and wellbeing.

**NAADUK** would like to thank all associations and organisations for their willingness to share their information for the benefit of the environment and people's health. A special thank you to the manufactures who have given their full co-operation in helping to produce this comprehensive document.

For further information about **NAADUK** and the benefits of joining, visit our website: www.naaduk.co.uk

| KEY: | DESCRIPTION: |
|---|---|
| **Bold:** | **Key Information** |
| *Italics:* | *Person Title/Document Title* |
| Red: | Cautions & Warnings |
| Blue Text: | Quotations from Referenced Documents |
| Orange: | Advice & Best Practice |

# INTRODUCTION TO FIRE DAMPERS

# 1 INTRODUCTION TO FIRE DAMPERS— LEGAL, STANDARDS AND COMPLIANCE

In all situations fire dampers, motorised fire dampers and smoke control dampers are designed to protect the occupants of the building from fire and smoke. Smoke control dampers are not covered in this guidance document but are referred to throughout. Fire dampers are installed to maintain the integrity of the fire compartments in the event of a fire, as part of the passive fire protection system.

There are many stages in a fire damper's life cycle and **NAAD-22** will take the legislation, guidance and best practice, to inform *responsible persons, duty holders, maintenance engineers, installers, designers* and other invested parties to understand what is required.

This guidance document, **NAAD-22**, for fire dampers was created to highlight the responsibilities and transfer of responsibilities between all parties mentioned above and is broken down into three sections:

1. **Routine Maintenance, Testing & Inspection**
2. **Installation, Testing & Commissioning**
3. **Design for and Selection of Fire Dampers**

The main guidance around fire dampers can be found in **Approved Document B, BS 9999, BS 9991, ASFP Grey Book & BESA DW:145**. This guidance can and should be considered, as following it will fulfil the minimum requirements set out in **Building Regulations and the Regulatory Reform (Fire Safety) Order 2005**.

Complying with NAAD22 will improve the reputation of an organisation and compliance with industry standards demonstrates an organisations commitment to safety, quality, and professionalism.

Fire dampers are an integral part of containing the spread of fire within buildings. They are there for the protection of life and the protection of further damage to the property within them.

In all situations we must remember that:

**FIRE DAMPERS ARE PART OF A LIFE SAFETY SYSTEM**

***Life Safety System Definition—applies to any system incorporated into a building where the purpose is the protection and preservation of human life during an emergency***

## 2 CLARIFICATION OF DAMPER TYPES

Unfortunately many publications including **Approved Document B (ADB)**, use the reference "fire and smoke damper" or "combination fire and smoke damper". This can lead to confusion. As an industry we are changing this to simplify the issue, hence the use of Motorised Fire Damper in this document for **Method 4**. There are other forms of response to a smoke alarm, each method usually requires some motive power device and the **S classification**.

Not covered in this document are Smoke Control Dampers (SCDs). These have an application simply for smoke control systems. They must have an actuator and are motor open/motor closed – no springs and no fusible links. They have different standards for testing and classification. They have no safety position, and their required position is only known when a fire breaks out and smoke and heat are produced.

### 2.1 SUMMARY OF DAMPER TYPES

**Table No.1 — Damper Types**

| TYPE | DESCRIPTION | CLASSISFICATION | OPERATION | TESTED TO |
|---|---|---|---|---|
| FD | Fire Damper | E classification | Fusible link only | Tested to EN 1366-2 |
| MFD | Motorised Fire Damper | With ES classification | Close in response to alarm<br>Fusible link | Tested to EN 1366-2 |
| SCD* | Smoke Control Damper | With ES classification | Open or close under the cause and effect in a smoke control system | Tested to EN 1366-10 |

**-The latter SCDs are not dealt with in this document, but it is important to know the differences. They do not need the word motorised because they must be motorised.*

# 3 IS THE PERSON QUALIFIED AND COMPETENT?

## 3.1 GENERAL

As with all works of a mechanical and construction nature, selecting a person or company with the correct skills and qualifications are key to completing works safely and to the correct standard.

**BSI Flex 8670: v3.0 2021-04 (PAS:8670)** - States
**3.6 competence framework**

''procedures and requirements for the development, assessment and maintenance of agreed skills, knowledge, experience and behaviours required for an individual undertaking a role, function, activity or task in order to perform their work to predetermined standards and expectations and maintain or improve their performance over time.''

The **Management of Health and Safety at Work Regulations 1999 (MHSWR)** requires an employer to appoint one or more competent people to help them implement the measures they need to take to comply with the legal requirements. That could be a member of the workforce, the owner/manager, or an external consultant. The competent person should focus on the significant risks and those with serious consequences.

**PAS-8670** - states "it is vital that people do not act beyond the limits of their competence to avoid exposing themselves and potentially other people to a wide range of risks. This includes risk of death or injury, litigation, prosecution and breach of contract (amongst others)."

The installation and commissioning of fire and smoke dampers are National Vocational Qualification (NVQ or SVQ) level tasks and should be completed by the relevant qualified person(s). This should be used in conjunction with 3rd party accreditation and qualification to decide competency. Qualifications form part of competency when assessed with the knowledge and experience of an individual.

For fire damper testing and inspection there is a **National Occupational Standard (NOS) and CITB GET 2937 Fire & Smoke Control Damper Inspection, Testing, Replacement & Installation**. This should be used in conjunction with 3rd party accreditation and qualification to help demonstrate competency.

To ensue an understanding of the full NOS standards and training landscape, see **Appendix G**.

## 3.2 DUTY OF THE RESPONSIBLE PERSONS

A key legal duty of the responsible person is to ensure that they appoint people who are competent to carry out their duties. To fulfil this duty, there must be a system for checking the competency of every employee. As stated in **Construction (Design and Management) Regulation 2015 (CDM) Paragraph 112 & Section 163.** This may sound obvious, but it does not always happen.

**Only technicians with the relevant card and correct qualifications, identified on the reverse, can conduct relevant works.**

# 4 DUE DILIGENCE IN SELECTING CONTRACTORS

Due care must be taken when selecting a contractor to carry out any works on fire dampers. You must ensure that the company and the individual technicians are fully compliant and competent. NAADUK suggest that the following criteria should be taken into account:-

- The number of years operating as installation specialists.
- Demonstration of project references in similar size and value.
- The total number of qualified fire damper technicians employed full time.
- The qualification of staff by qualified instructors and the quality of procedures assessed by independent auditors, should be, but not restricted to those who are CITB, CITBNI, NVQ, SQA Diploma to NOS Standards and/or NAADUK approved.
- Quality assurance should be ISO 9001 or from independent auditors.
- Training centres should be CITB ATO, SQA or equivalent.
- 3rd party certification of installation companies for fire dampers.
- Health and Safety policy provided by contractor, should be specific to work carried out. Should be able to provide full RAMS.
- Assessment of recognised awards, continuing professional development etc.
- Memberships of an approved H&S organisation, such as SSIP, CHAS, Safecontractor, RESET, Constructionline, BRE or equivalent.
- Insurance of Professional Indemnity, Public Liability, clearly stating extent and limits of cover.
- Financial statements appropriate to the contractor carrying out the project in full showing that they have the resources and assets to cover costs related to the works.

# 5 GOLDEN THREAD

In her post Grenfell review Dame Judith Hackitt noted many things and highlighted that building information was at the best disjointed, particularly with regard to fire safety. The result of this is the development of the golden thread process.

The golden thread is a measure to track building information, in our case for fire safety for the life of a building. It will be required for new buildings and existing buildings will be expected to catch up over time. This generally applies to High Risk Buildings and may start to spill over into all others. The exact regulatory guidance is not clear at time of writing for non-HRBs. The golden thread provides: the information about a building that allows someone to understand a building and keep it safe, and the information management to ensure the information is accurate, easily understandable, can be accessed by those who need it and is up to date.

It will be the duty of the people responsible for a building to put in place and maintain a golden thread of information. Having a golden thread will mean that those people responsible will have easily accessible, reliable, up to date and accurate information. Implementation of the golden thread will require individuals and organisations responsible for a building to have good information management systems. Going forward the information management for safety will need to be embedded across the sector

It is probable that there will be an individual record for each asset, for instance a fire damper. This will record the manufacturer, classification, the installation details (instructions and practical), relevant

photographs etc. and also test and maintenance results during the life of the building. Thus, it may be seen that that reports may need to be machine readable to assign inspection information to a specific asset at some point in the future.

An example of broader information that might be required would be plans that include information such as details of the proposed use or uses of the building as a whole, block height in metres, number of storeys etc.

The golden thread needs to be created before building work starts and the golden thread must be kept updated throughout the design and construction process. When the building work is completed the golden thread must be handed over to the accountable person, who is responsible for the occupied building. The golden thread is expected to contain the information needed to demonstrate compliance with specified building regulations.

In occupied buildings the golden thread will need to contain the information needed for the safety of the building and its occupiers/residents. It will contain the information and documents produced for registration and certification, safety case, mandatory occurrence reporting and resident engagement. For buildings undergoing refurbishment, relevant information will need to be added to the golden thread.

The golden thread will have to be kept in a digital format and is expected to be kept up to date with any relevant information that becomes available – inspection reports, risk assessments etc. It will be a living document. Residents will be provided with information about their building and have the right to request further information on their building from the accountable person.

# 6 FIRE COMPARTMENTATION

## 6.1 WHAT IS COMPARTMENTATION?

Compartmentation is the process of dividing a structure into 'compartments' or areas to contain the fire, reduce its spread and provide means of escape. Compartmentation is a life safety consideration, provides means of escape and also protects fire fighters as they approach the fire later in the development of the fire.

**As a statutory requirement it is used to satisfy section B3 of the Building Regulations, summarised with regard to compartmentation below**

**Requirement B3: Internal fire spread (structure) from Part B of Schedule 1 to the Building Regulations 2010.**

**B3. (3) Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following—**
**(a) sub-division of the building with fire-resisting construction;**

**B3. (4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.**

**This in turn is supported by guidance from Approved Document B.**

**The requirement B3 is met by achieving all of the following.**

**a. For defined periods, loadbearing elements of structure withstand the effects of fire without loss of stability.**

**b. Compartmentation of buildings by fire resisting construction elements.**

**c. Automatic fire suppression is provided where it is necessary**

**d. Protection of openings in fire-separating elements to maintain continuity of the fire separation.**

**e. Inhibition of the unseen spread of fire and smoke in cavities, in order to reduce the risk of structural failure and spread of fire and smoke, where they pose a threat to the safety of people in and around the building.**

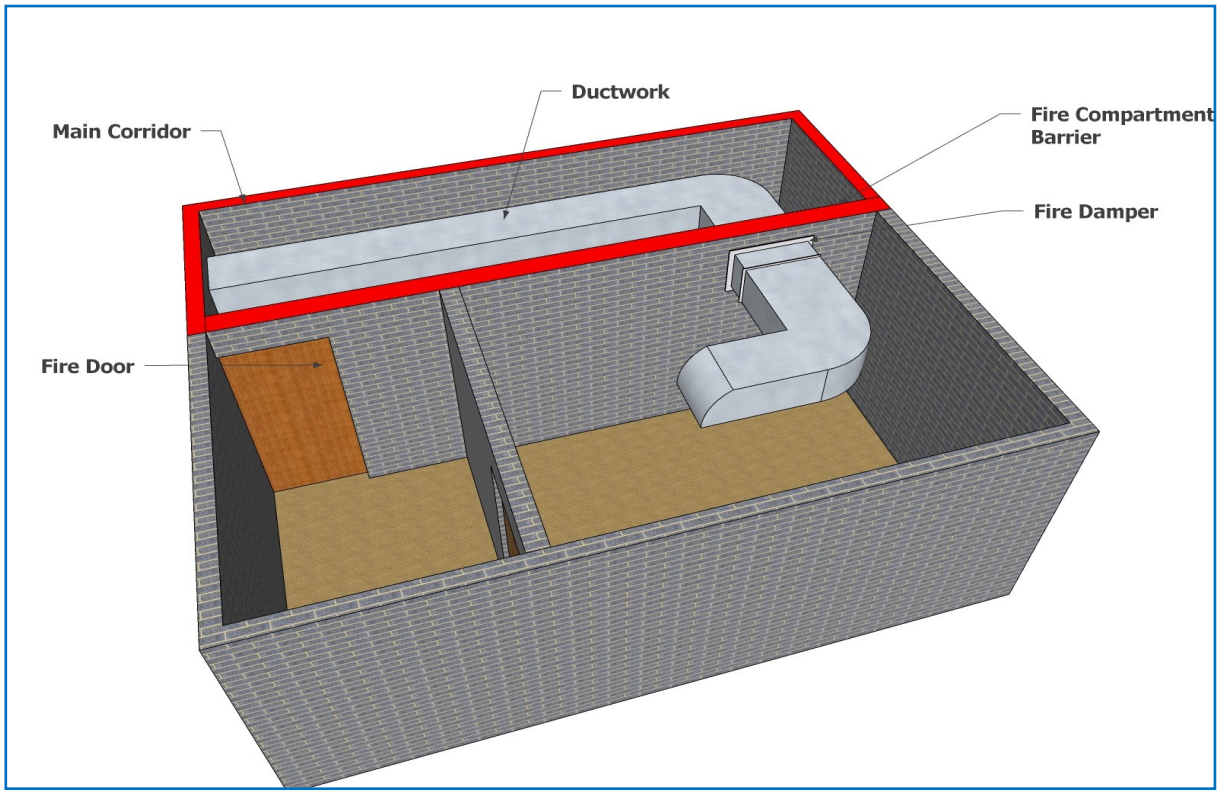
The extent to which any of these measures are necessary is dependent on the use of the building and, in some cases, its size, and on the location of the elements of construction.

As explained, the main objective of compartmentation is to contain a fire within a specific section of a building, limiting the passage of flames and, to an extent, smoke. This then allows more time for occupants to safely evacuate a building and for fire services to extinguish the fire, reducing the risk to life. Understanding fire compartmentation is crucial to the fire safety of the building, and **NAAD22** references the **Association for Specialist Fire Protection (ASFP)** document **ASFP On-site guide to installing fire-stopping**.

The **ASFP** has kindly allowed permission for the main section of the document to be added to **NAAD22** in **Appendix E.**

## 6.2 COMPARTMENT EXAMPLE

**Fig No. 1— Compartment Example (Indicative only)**



# 7 WHERE SHOULD A FIRE DAMPER BE SITUATED AND HOW?

Fire dampers are part of passive fire protection and should be part of the fire risk assessment required by **RRFSO 2005** and are considered a measure to reduce the risk and the effects of fire within a premises. For full explanation please refer to **NAAD22: Part 3 — Design for and Selection of Fire Dampers.**

Fire dampers are a critical part of a buildings fire strategy and as such should installed at certain locations and following a specific method, this is often referred to as the **Installation Operation Maintenance (IOMs).** It is a requirement that manufacturers provide IOMs for all models, free of charge. These can be downloaded from the manufacturers' websites.

Fire dampers should be installed to protect the fire compartments highlighted in the fire strategy where required.

Fire dampers are classed as an element within the compartmentation strategy and utilising all related guidance and legislation the key points are the following:-

**Approved Document B Vol 2**

**Effective compartmentation relies on both of the following:**

1) **Fire resistance should be continuous at the join between elements forming a compartment.**
2) **Any openings between two compartments should not reduce the fire resistance.**

**And**

**BS 9999—Installation and specification of fire dampers**

**Fire dampers should be situated within the thickness of the fire separating element. To ensure that the damper will not be displaced by movement or collapse of the duct, dampers should be securely fixed and provided with breakaway joints in accordance with manufacturer's instructions.**

For installation clearances please refer to **NAAD-22 Part 2: Installation, Testing & Commissioning** for reference to minimum installation clearances as per **BS EN 1366-2: Fire Resistance Tests for Service Installations Part 2: Fire Dampers.**

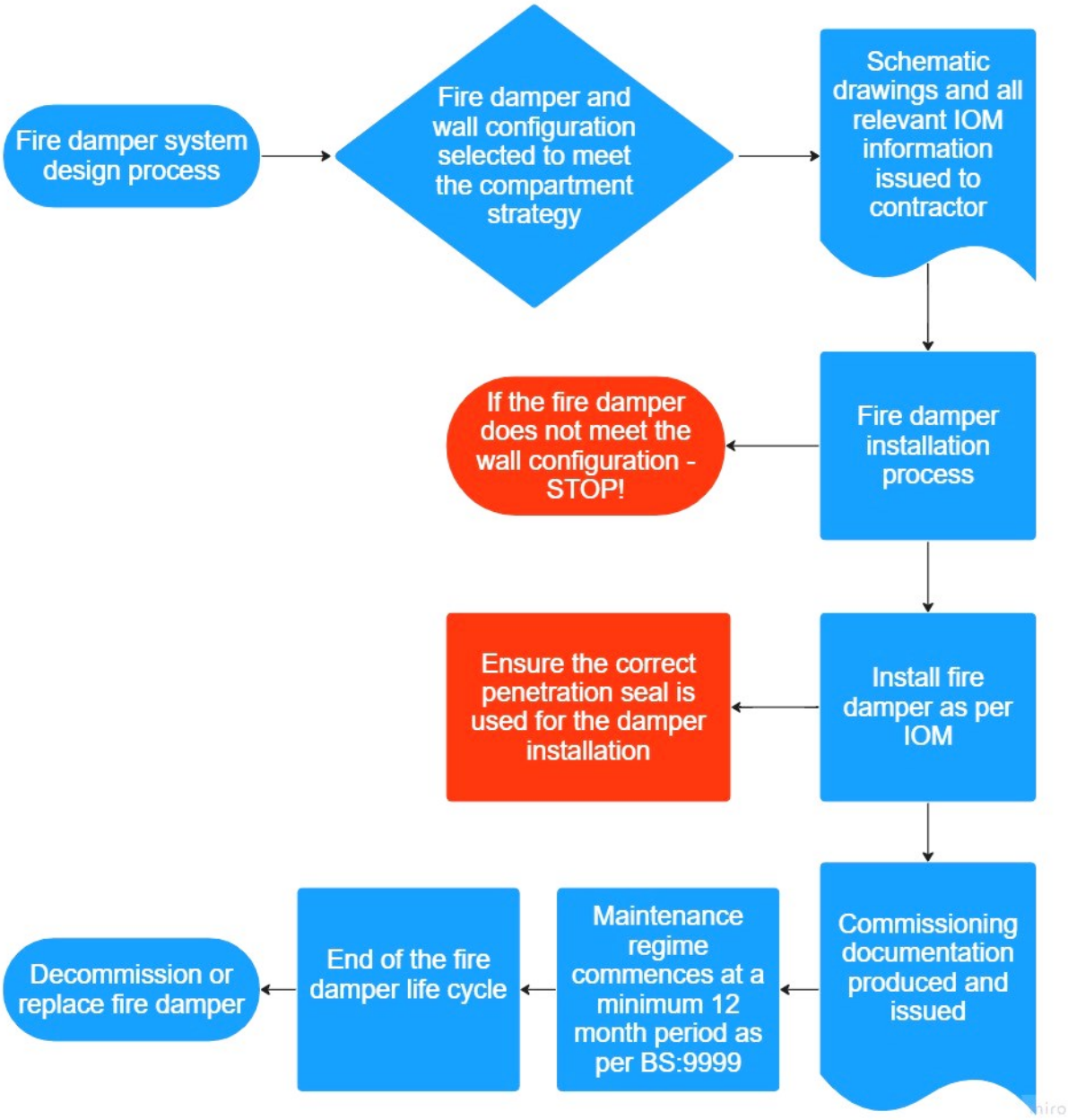
**The above statements are TRUE unless the fire damper is tested otherwise.**

**Fire dampers are part of the compartmentation system and should be treated as such.**

# 8 FIRE DAMPER CYCLE PROCESS MAP

As with all elements within the built environment there is a process for the life cycle of equipment for fire and smoke control systems. The table below is a simple guide to the process and different companies will follow different internal processes.

**Fig No. 2— Fire Damper Life Cycle**




**Fire dampers must always match the wall configuration highlighted in the Installation Operating Manual (IOM) unless an approved installation deviation is permitted.**

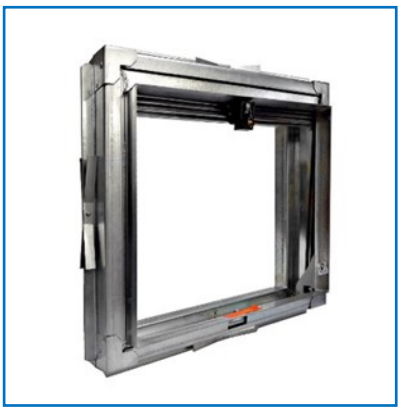
**If you make the decision to alter the installation method then you are responsible for that design decision.**

# 9 FIRE DAMPER CLASSIFICATIONS, FUSIBLE LINK TYPES AND COMPONENTS

## 9.1 WHAT IS A MECHANICAL FIRE DAMPER (FD)?

A fire damper is a mechanical device that triggers at 72°C(+/- 4°C) and prevents the spread of fire by sealing the compartment. This damper has a rating of E or E(I) and should never be used for the control of smoke.

**Fig No. 3— FD**



## 9.2 WHAT IS A MOTORISED FIRE DAMPER (MFD)?

A motorised fire damper is a fire damper that is activated on the early detection of smoke by a signal source and has a failsafe position of closed. This damper has a rating of ES(I) and has a reduced smoke leakage.

**Fig No. 4— MFD**

## 9.3 WHAT IS A SMOKE CONTROL DAMPER (SCD)?

A Smoke Control Damper is a different style of damper to be used in smoke control systems. It should not be confused with an ES classified MFD. SCDs are motor open/motor closed devices and have no fusible links. SCDs are not dealt with in this document, as they have a different set of standards, and this publication deals with HVAC ventilation systems only.

**Fig No. 5— SCD**

## 9.4 INTUMESCENT FIRE DAMPER

This is a device that incorporates intumescent materials that expand to seal off a compartment and prevent the passage of fire. Activation is influenced by the type of intumescent material used. The temperatures typically range from 120°C to 270°C. Test results are required for the method of installation and plane of installation (horizontal or vertical). This type of fire damper cannot be site tested and **must not get wet**.

**Fig No. 6—Intumescent Fire Damper**

## 9.5 FIRE DAMPER VARIATIONS

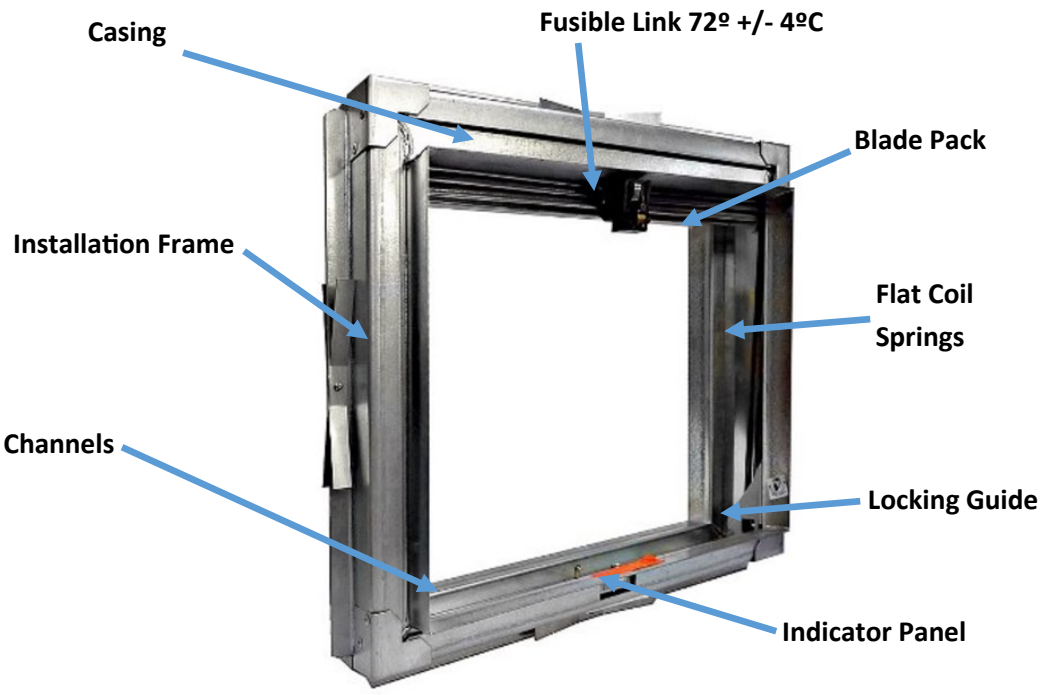
Fire dampers have different manufacturers and different models, each fire damper has a specific way in which it should be installed. Many fire damper models have multiple applications and different variations that they can be installed to. For different applications wall constructions and compartment times, please refer to **NAAD-22 Part 3: Design For and Selection of Fire Dampers** and manufacturers' technical documents, Declaration of Performance (DoP) & IOMs.

There are also variations in the types of fusible links and activation methods that a fire damper can have installed on them. Please see the diagrams on the following pages that show several variations of damper, as well as fusible link difference that you may come across.

**Remember fire dampers protect the compartment not the ductwork.**

## 9.6 FIRE DAMPER COMMON COMPONENT BREAKDOWN

**Fig No. 7 — Mechanical Fire Damper (FD)**




**No E classified dampers should be used in the containment of SMOKE or in the protection of escape routes or areas of sleeping risk**

**Fig No. 8 — Hand Resettable Fire Damper**

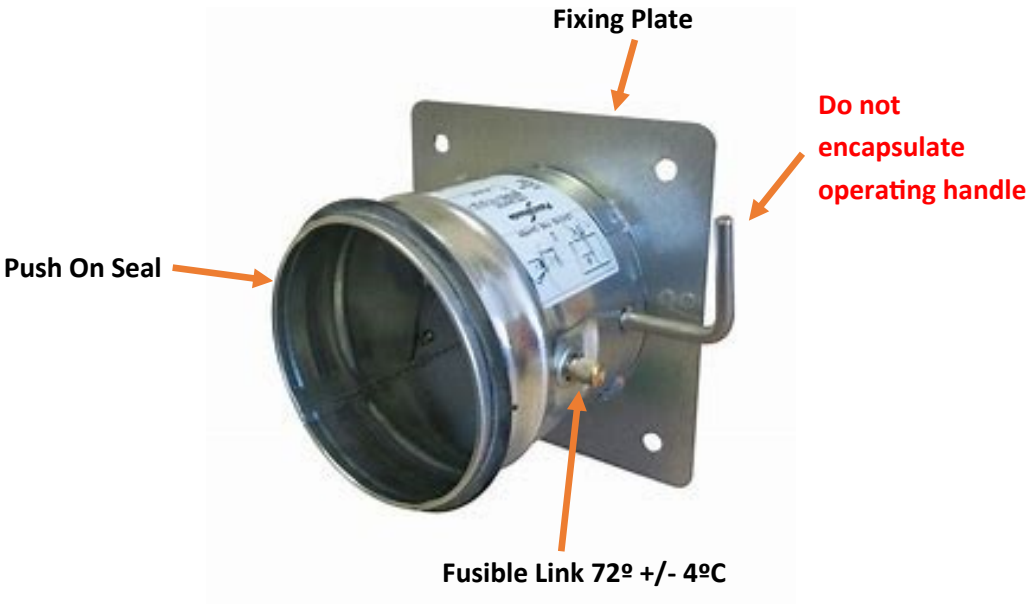
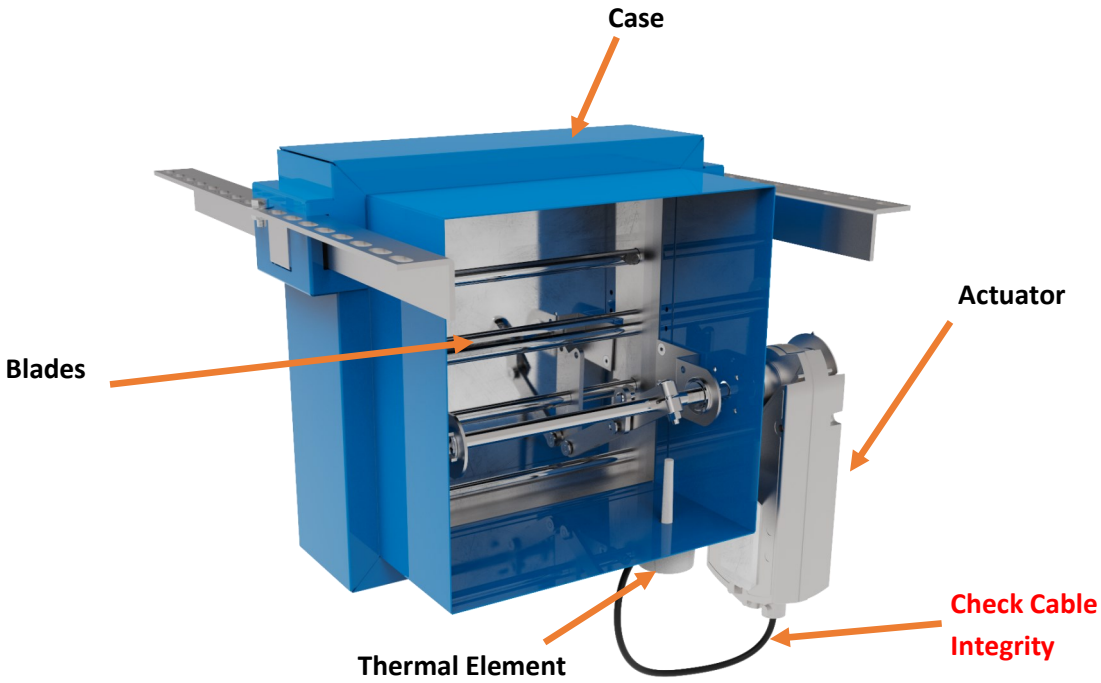
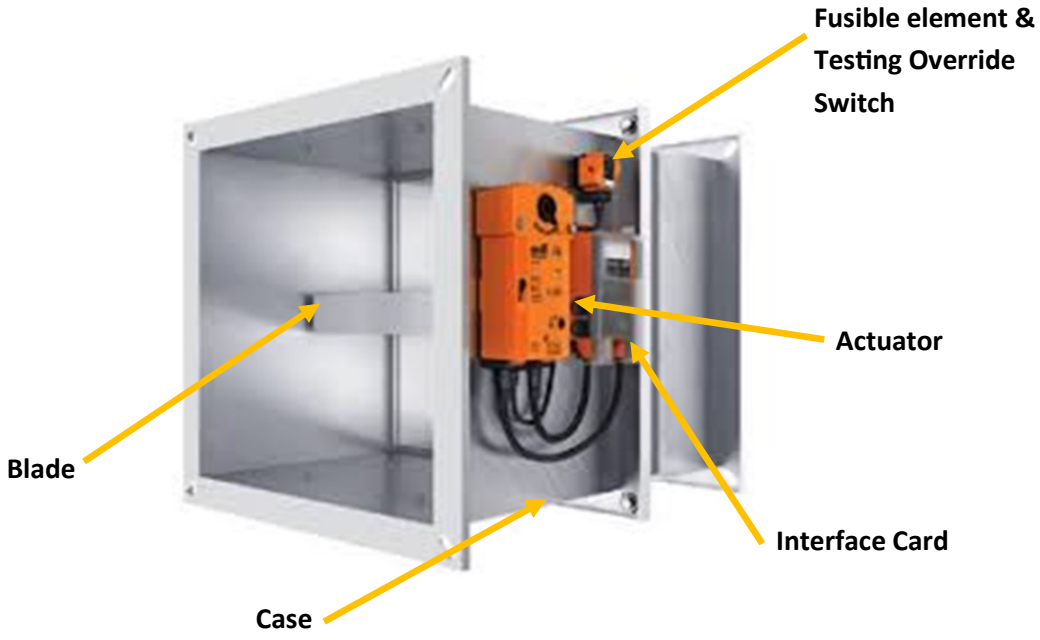


Fig No. 9 — Motorised Fire Damper (MFD)



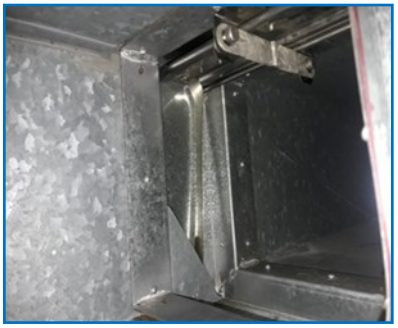

No E classified dampers should be used in the containment of SMOKE or in the protection of escape routes or areas of sleeping risk

Fig No. 10 — Insulated Motorised Fire Damper (MFD)



## 9.7 TYPES OF FUSIBLE LINKS

**Fig No. 11— Standard Latch**

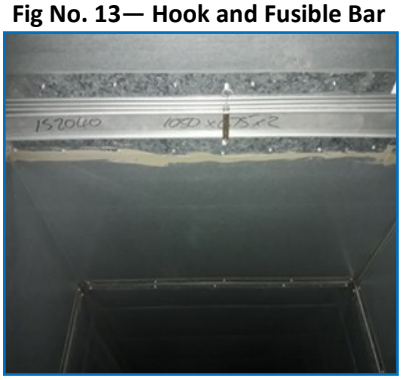


**Standard Latch—** A solid bar with either holes, studs or lips to hold the latch in place to allow the link to separate in the middle.

**Fig No. 12— Gate Latch**

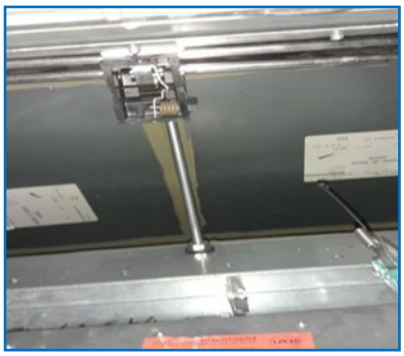
**Gate Latch—** A solid bar with two studs locked in by two moving catches that release the damper to mimic activation. In a fire the link should separate in the middle as per the standard latch.

**Fig No. 13— Hook and Fusible Bar**



**Hook and Fusible Bar—** A solid bar that has two hooks attached to either end, these can have spacer links in between where required. To test you need to remove one of the hooks from its fixing. In a fire the link will separate in the middle.

**Fig No. 14— Spring Cassette**



**Spring Cassette—** A spring loaded cassette that holds the damper with, usually, two large teeth. To activate press the button on the side of the cassette to release the teeth. In a fire there is a link inside the cassette that will separate releasing the teeth.

**Fig No. 15— Single Blade/Spring Lever**

**Single Blade/Spring Lever—** It is crucial to ensure that no obstacle interferes with the handle as this will move when activated. In a fire there is a link that will separate in the mechanism that will allow the blade (and handle) to move to the closed position. You must not encase the expansion zone or lock the lever once installed.

**Please Note: Do not obstruct damper operating lever with batt**

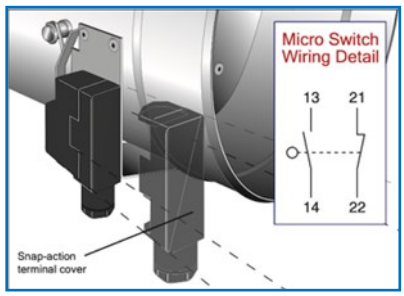



**Fig No. 16— Factory Fitted Micro Switch**

**The Factory Fitted Micro Switch—** This can be used in conjunction with the single blade/spring lever damper and provides a remote indication of the fire damper status. These are installed on the opposite side to the handle and attached to the spindle mechanism.

They may also be fitted internally in a curtain damper bottom channel or on the casing to touch blades in ES models.

**Fig No. 17— Insulated Ceramic Damper**

**Insulated Ceramic Damper—** These generally have an activation button on the side of the control unit that imitates the release of the fusible link. These dampers usually have a handle to reset on the mechanism housing. Any handles or operators must not be blocked during installation. Insulated fire dampers have dramatically reduced heat transfer compared to other fire dampers in the event of a fire.

As with all fire damper makes and models there is a testing guide contained within the manufacturers maintenance document, each damper does come with specific maintenance requirements. These can be downloaded from the manufacturers' websites.

PART 1

# PART 1:
# Routine Maintenance, Testing & Inspection

# PART 1 —ROUTINE MAINTENANCE, TESTING & INSPECTION

# 1 INTRODUCTION TO ROUTINE MAINTENANCE, TESTING & INSPECTION

Fire dampers are an integral part of the passive fire protection system that ensures compartmentation in the event of a fire. The guidance around testing and maintenance of fire dampers can be found in **BS 9999**. This guidance can and should be considered, as following it will fulfil the minimum requirements set out in **Building Regulations and the Regulatory Reform (Fire Safety) Order 2005**.

Fire dampers are the responsibility of the responsible persons and building owners and are to be tested at least annually as detailed in:

**BS 9999 Annex W**

**"Arrangements should be made for all fire dampers to be tested by a competent person on completion of the installation and at least annually, and to be repaired or replaced immediately if found to be faulty. Spring-operated fire dampers should be tested annually and fire dampers situated in dust-laden and similar atmospheres should be tested much more frequently, at periods suited to the degree of pollution.**

**Arrangements should be made for periodic maintenance of any smoke detector system used to operate fire dampers and for such system(s) to be tested by a competent person after installation to determine whether detection occurs at the appropriate design smoke density. Any smoke detector system that is found to be faulty should be either repaired or replaced immediately."**

**BS 9999 Annex I**

**Weekly— Smoke control systems for means of escape**

**Actuation of the system should be simulated once a week. It should be ensured that any fans and powered exhaust ventilators operate correctly, smoke dampers close (or open in some systems), natural exhaust ventilators open, automatic smoke curtains move into position, etc.**

***NOTE On large multi-zone installations it might be acceptable, with agreement from the relevant authorities, to rotate the equipment tested so that a system is tested every week and individual items are operated at intervals of no more than three months.***

**Yearly—In addition to the checks recommended in I.2, I.3, I.4, I.5 and I.6, arrangements should be made for annual inspections and performance tests of the following to be carried out by competent persons, for any defects to be logged and the necessary action taken, and for certificates of testing to be obtained (…) e) fire dampers**

In all situations, fire dampers and motorised fire dampers are designed to protect the occupants of the building from fire and maintain the integrity of the fire compartments in the event of a fire.

Fire damper control panels and associated fire dampers need to be checked weekly, like fire alarms, using competent people locally (maintenance personnel).

This manual is guidance for how fire dampers should be maintained, tested and inspected, who should be testing the fire dampers and the duties of the responsible persons and duty holders.

***Life Safety System Definition*— applies to any system incorporated into a building where the purpose is the protection and preservation of human life during an emergency.**

**FIRE DAMPERS ARE PART OF A LIFE SAFETY SYSTEM.**

# 2 RESPONSIBLE PERSON OR DUTY HOLDER— ARE YOU ONE?

## 2.1 GENERAL

**You are the *responsible person* under the RRFSO 2005, if:**

- you own the building (only in relation to the non-domestic parts)
- you have control over the premises

**Duty of the responsible persons:**

**RRFSO 2005 Section 8 states-**

**"The responsible person must - take such general fire precautions as will ensure, so far as is reasonably practicable, the safety of any of his employees; and in relation to relevant persons who are not his employees, take such general fire precautions as may reasonably be required in the circumstances of the case to ensure that the premises are safe."**

**What does this mean in regards to fire dampers**?

The responsible person is to arrange the testing and maintenance of fire dampers at a period not exceeding 12 months by a competent qualified person. It is the responsibility of the responsible person to conduct due diligence of the appointed persons and company conducting the works to ensure the standards are met.

## 2.2 ARE YOU A DUTY HOLDER?

If you have confirmed you are not the *Responsible Person* you may still be a *Duty Holder* with some responsibilities under the Fire Safety Order if you have some control within the premises.

You are considered to have control of a premises if you are subject to a contract or tenancy that makes you responsible for the maintenance or repair of the premises themselves or anything in or on them.

Examples of *Duty Holders* may include but are not limited to:

- Fire risk assessor
- Fire alarm engineer
- Managing agent
- Duty manager
- 3rd Party inspector
- Fire damper inspector

**A fire damper inspector is considered a *duty holder* under the Fire Safety Act 2022 as highlighted in the above list.**

**Always identify the site responsible person as part of fire damper testing and maintenance.**

**ALL DUTY HOLDERS SHOULD PROVIDE EVIDENCE OF COMPETENCY**

# 3 REPORTS AND DOCUMENTATION

There are several things that are required to happen with the fire damper documentation and reports. All of this information should be contained within the Fire Safety Manual as highlighted in **Clause 9** and **BS 9999 Annex H.** For further information on what it should contain please reference the guidance document.

**All reports must be kept as part of the fire safety manual to show a full record of testing and actions. Considerations for the *Golden Thread* should be made when completing the reports.**

**BS 9999 Note W.3 Records**

**Maintenance should be planned and scheduled, and maintenance procedures should be standardized. The central system of records should include a complete inventory of the system, giving complete information on all equipment, components, distribution networks, electrical apparatus, controls and wiring. In particular the records should include the specification and location of fire dampers and cavity barriers, and the positions of all fire compartment boundaries and all cavity barriers should be marked on the installation drawings.**

**A certificate of completion should be obtained.**

***NOTE 2 In buildings with extensive ductwork systems, it can be advisable for plans to be kept on the premises that show the installed system, fire-fighting access panels, fire-fighters' control equipment, siting of fire dampers, and plant room access and layout. The provision of such plans, especially if displayed or readily available, can be of great assistance not only to fire and rescue service personnel but also to maintenance engineers working on the system.***

**Copies of all records should be added to the fire safety manual in line with the Golden Thread, see Introduction—Section 5: Golden Thread**.

Fire damper testing, commissioning and installation documents are a key component of the fire safety manual and should always be part of the fire risk assessment process. As the lifespan of the building is constantly progressing, equipment and systems will always need repairing and replacing. It is the responsibility of the fire safety management team to keep this record updated**.**

**BS 9999 Annex H.3**

**The fire safety manager and/or designated representatives should be responsible for the upkeep of the manual**

# 4 TESTING AND INSPECTION OF FIRE DAMPERS

## 4.1 GENERAL

There are several things, as a fire damper testing and inspection technician, that you are required to consider when completing your duties.

Always try to obtain site specific drawings to identify fire damper locations, do not rely on old drawings or reports as not all fire dampers might have been identified, try to locate fitting instructions for the fire dampers or **BESA DW/145 Guide to Good Practice For the Installation of Fire and Smoke Dampers** certificates of install.

If it is an older building where system schematics are not available either digitally or hard copy, then do not take previous fire damper asset collection as a true record. It is the responsibility of the fire damper technician to identify all assets in the responsible areas. It is considered good practice to request floor plans for the building and annotate fire damper locations when identified.

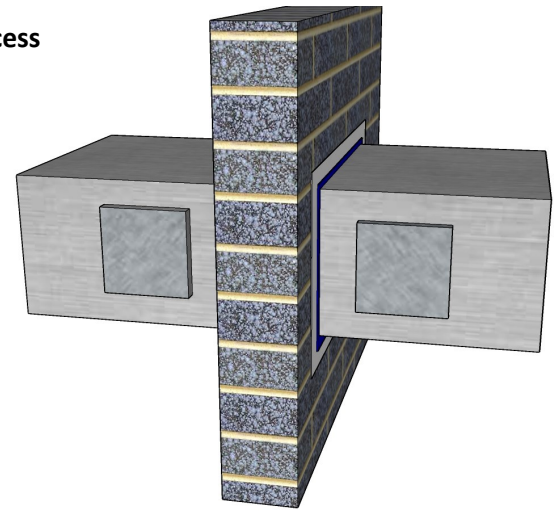
As a fire damper technician it is not unreasonable for you to spot places where a fire damper should be fitted but has not been e.g. in a barrier above a fire door.

## 4.2 FIRE DAMPER ACCESS

Access is always crucial for the ability to test fire dampers.

**BESA DW144 Spec for Sheet Metal Ductwork 2016** states fire dampers are required to have access either side for cleaning and maintenance, as shown in the diagram below:

**Fig No. 1— Fire Damper Access**



**Access to fire dampers is crucial for inspecting, maintaining, testing the fire damper in the correct orientation and for cleaning.**

**No cleaning can take place through the fire damper.**

## 4.3 SYSTEM CLEANLINESS AND ITS EFFECT ON FIRE DAMPERS

Cleanliness levels play a key role in the functionality of fire dampers, as heavily laden and contaminated ductwork can allow the fire to spread through the compartments before the fire damper has the chance to reach activation temperature. Even then the fire might have the opportunity to pass through the fire damper if it cannot lock into the locking guides correctly.

This ductwork (pictured) will not allow the damper to function in the correct manner and will not contain the spread of fire between compartments.

**Fig No. 2— Damper Cleanliness**

NAADUK recommends the Imperial College London Vacuum Test Sampling method to be conducted as part of the fire damper testing regime to place scientific UKAS accredited results for the dust contamination levels. This testing provides fact based scientific results that partners the photographic evidence.

## L24 Workplace Health, Safety and Welfare Regulation 1992 (Revised 2013)

**Regulation 5 Maintenance of workplace, and of equipment, devices and systems**

**Paragraph 1 — "The workplace and the equipment, devices and systems to which this regulation applies shall be maintained (including cleaned as appropriate) in an efficient state, in efficient working order and in good repair."**

**Paragraph 3(b) — "mechanical ventilation systems provided pursuant to regulation 6 (whether or not they include equipment or devices within sub-paragraph (a) of this paragraph); "**

**Regulation 6— Ventilation**

**Paragraph 1 — Effective and suitable provision shall be made to ensure that every enclosed workplace is ventilated by a sufficient quantity of fresh or purified air"**

**Approved Code of Practice (ACOP) 47 — "Enclosed workplaces should be sufficiently well ventilated so that stale air, and air which is hot or humid because of the processes or equipment in the workplace, is replaced at a reasonable rate.**

**ACOP 52 — "Mechanical ventilation systems (including air-conditioning systems) should be regularly and adequately cleaned. They should also be properly tested and maintained to ensure that they are kept clean and free from anything which may contaminate the air."**

**For ventilation cleanliness requirements please refer to NAAD21 for guidance.**

## 4.4 THE MECHANICAL FIRE DAMPER INSPECTION

**Table No.1—Mechanical Fire Damper Inspection**

| INTERVAL | TASK | NOTES | RECORD | RISK | WHO |
|---|---|---|---|---|---|
| Daily | If the FD has a microswitch that is connected to an indicator or control panel, check for faults and incorrect indications at the damper control panel | Corrective Action (CA)<br>Action taken to prevent recurrence (ATTPR) | Keep records by asset number | Advise of risk | Local competent person |
| Weekly | - | - | - | - | - |
| Monthly | - | - | - | - | - |
| Annually<br>For each fire damper asset | Confirm asset list of fire dampers | Check for changes | Add, change asset numbers as required | | Third party competent person |
| | Confirm installation method against manufacturer's Instructions (Including break away duct connections—For TEK Screws: See **Part 2—Section 3.2**) | Confirm against original install/ commissioning information or careful comparison with manufacturer's instructions | If installation is incorrect or cannot be confirmed, then the fire damper may not function in maintaining the compartmentation system<br>Provide photographic evidence all round and from both sides | Confirm<br>Or<br>If not confirmed advise of risk | |
| | Confirm state of Damper connection to compartment and its integrity | Any imperfections or concerns must be reported | If this is incomplete then the fire damper may not function in maintaining compartmentation<br>Provide photographic evidence all round and from both sides | Confirm penetration seal complete<br>Or<br>Advise repair necessary<br>Advise of risk if incomplete and unrepaired | |
| | Ensure each damper can be accessed from both sides. | This means being able to open and gain access to the ductwork to see the inside of the fire damper from both sides with the ability to operate the damper, observe full open and closure, and clean the unit | Add to record<br>If this is not possible, then advise that access is required<br>Provide photographic evidence all round and from both sides | Confirm adequate access<br>Or<br>Advise access needed<br>Advise of risk as fire damper is unchecked and uncleaned | |
| | Estimate adjacent duct cleanliness | Dirty ductwork is also a fire risk | Provide photographic evidence | | |

## 4.4 THE MECHANICAL FIRE DAMPER INSPECTION CONTINUED

| INTERVAL | TASK | NOTES | RECORD | RISK | WHO |
|---|---|---|---|---|---|
| Annually<br><br>For each fire damper asset annually | Operate the damper to move to the closed position | Verify that the damper physically closes completely | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | Third party competent person |
| | Operate the damper to move to the open position | Verify that the damper physically opens completely | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | Inspect the latching mechanism and ensure it is secure. | Verify | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | If there are any external release mechanisms, cables etc associated with the FD confirm their condition and functionality | Verify | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | If there is any external wiring associated with the FD (microswitch indication), examine the condition of all associated wiring and terminations. | Verify | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | Remove any dirt, dust or debris from within damper assembly. | Confirm that the fire damper has nothing that can interrupt its operation | - | - | |
| | Clean the damper in accordance with the manufacturer's recommendations. | Confirm that the damper has been cleaned | Provide photographic evidence<br>Add to record<br>Check prior record, to see if anything has changed | Done/ Not done<br><br>Advise risk if there are continuing issues | |
| | Report any severe corrosion to the client. | If the fire damper is not opening and closing very easily this would be unacceptable | Provide photographic evidence<br>Add to record<br>Check prior record, to see if anything has changed | Advise risk | |
| | Where lubrication is required, the damper manufacturer's specific instructions should be followed | Preferably the fire damper should just be left in the cleaned state | If the fire damper has been lubricated add this to the record | - | |
| | Check and ensure security of all access doors and gaskets. Check for air leaks. | Confirm | - | - | |

## 4.5 THE MOTORISED FIRE DAMPER INSPECTION

**Table No.2—Motorised Fire Damper Inspection**

| INTERVAL | TASK | NOTES | RECORD | RISK | WHO |
|---|---|---|---|---|---|
| Daily | Check for faults and incorrect indications at the damper control panel | Corrective Action (CA)<br>Action taken to prevent recurrence (ATTPR) | Keep records by asset number | Advise of risk | Local competent person |
| Weekly | Simulate alarms and confirm fire damper actions on panel | CA<br>ATTPR | Keep records by asset number | Advise of risk | Local competent person |
| Monthly | Simulate alarms and confirm fire damper actions at the fire damper | CA<br>ATTPR | Keep records by asset number | Advise of risk | Local competent person |
| Annually<br><br>For each fire damper asset | Confirm asset list of fire dampers | Check for changes | Add, remove asset numbers as required | | Third party competent person |
| | Confirm installation method against manufacturer's instructions (including TEK screws) | Confirm against original install/ commissioning information or careful comparison with manufacturer's instructions | If installation is incorrect or cannot be confirmed, then the fire damper may not function in maintaining the compartmentation system<br>Provide photographic evidence all round and from both sides | Confirm<br>Or<br>If not confirmed advise of risk | |
| | Confirm state of penetration seal and its integrity | Any imperfections or concerns must be reported | If this is incomplete then the fire damper may not function in maintaining the compartmentation system<br>Provide photographic evidence all round and from both sides | Confirm penetration seal complete<br>Or<br>Advise repair necessary<br>Advise of risk if incomplete and unrepaired | |
| | Ensure each damper can be accessed from both sides. | This means being able to open and gain access to the ductwork to see the inside of the fire damper from both sides with the ability to operate the damper, observe full open and closure, and clean the unit | Add to record<br>If this is not possible, then advise that access is required<br>Provide photographic evidence all round and from both sides | Confirm adequate access<br>Or<br>Advise access needed<br>Advise of risk as fire damper is unchecked and uncleaned | |
| | Estimate adjacent duct cleanliness | Dirty ductwork is also a fire risk | Provide photographic evidence | | |

## 4.5 THE MOTORISED FIRE DAMPER INSPECTION CONTINUED

| INTERVAL | TASK | NOTES | RECORD | RISK | WHO |
|---|---|---|---|---|---|
| Annually<br><br>For each fire damper asset annually | Verify that the damper can be operated by a fire alarm signal, control panel, or heat/smoke detector, in accordance with the system design. | Check continuity from detector to the individual fire damper | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | Third party competent person |
| | Examine the condition of all associated wiring and terminations. | Verify | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | Operate the damper to move to the closed position | Verify that the damper physically closes completely and that any lights/indications on the control panel also indicate this correctly | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | Operate the damper to move to the open position | Verify that the damper physically opens completely and that any lights/indications on the control panel also indicate this correctly | Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | Inspect any connection mechanisms and the actuator | Confirm that all mechanisms are complete, and that the actuator is securely fixed to the fire damper. Confirm that the fusible element arrangement is fitted | Provide photographic evidence<br>Add to record<br>Check prior record, to see if anything has changed<br>Have previous Corrective Actions been completed? | Pass/fail<br><br>Advise risk if there are continuing issues | |
| | Remove any dirt, dust or debris from within damper assembly. | Confirm that the fire damper has nothing that can interrupt its operation | - | - | |
| | Clean the damper in accordance with the manufacturer's recommendations. | Confirm that the damper has been cleaned | Provide photographic evidence<br>Add to record<br>Check prior record, to see if anything has changed | Done/ Not done<br><br>Advise risk if there are continuing issues | |
| | Report any severe corrosion to the client. | If the fire damper is not opening and closing very easily this would be unacceptable | Provide photographic evidence<br>Add to record<br>Check prior record, to see if anything has changed | Advise risk | |
| | Where lubrication is required, the damper manufacturer's specific instructions should be followed | Preferably the fire damper should just be left in the cleaned state | If the fire damper has been lubricated add this to the record | - | |
| | Check and ensure security of all access doors and gaskets. Check for air leaks. | Confirm | - | - | |

## 4.6 FUNCTIONAL TEST

- Access the fire damper
- Take photographs of the penetration seals
- Take photographs of the contamination levels
- Clean the fire damper of all debris and contaminants
- Take photographs to show pre-test fire damper position
- Activate the fire damper how it should operate either by removing the fusible link or operating from the MFD control source
- Take photographs of the fire damper in the closed position
- Reset damper to the sat open position
- Replace access door

**All defects must be photographed and recorded. All defects are critical as fire dampers and smoke control dampers are a LIFE SAFETY SYSTEM.**

**Fig No. 3,4,5 (L-R) — Functional Test**

## 4.7 WHAT REPORTS MUST OUTLINE

**Table No.3 — Report Outline**

| REPORT CONTENT | |
|---|---|
| **Unique Reference Number** | This must be specific to the site and current best practice utilises 2D or standard barcoding that creates a damper history portfolio. This may need to reflect any golden thread asset number. |
| **Location** | A clear location identification using a fixed reference point or marking on a schematic drawing so asset can be mistaken. |
| **Manufacturer/Type** | This is the type whether FD or MFD. This is key when comparing it to the strategy and design documents. |
| **System Type** | Supply, extract or air transfer. |
| **Photographic Evidence** | Must be taken showing pre-test, post-test, reset of damper, failures etc. this is a current date stamped photograph. Some clients will not allow photography due to personal protection, Official Secrets Act etc. On these examples an exception instruction should be given by the site responsible person. Photograph from both sides. |
| **Condition** | Is the fire damper corroded or does it have any defects that will impact on the performance of the damper? |
| **Size (Dimensions)** | The size of the fire damper is critical for accurately conducting remedial works. |
| **Cleanliness** | As per the H&S Act 1992, the fire damper must be cleaned and maintained. |
| **Remedial Actions** | Any defects must be recorded and in buildings where applicable a photograph highlighting the defect should be taken. This may include action taken to prevent recurrence. |
| **Fire Barrier Integrity** | Any identified damage to the fire barrier should be reported to the responsible person in the report. |
| **Installation Defects** | Is the fire damper securely fixed and are there any defects that are identifiable that shows the damper or ductwork is not installed as per manufacturers fitting instruction. These can include self-drilling screws, incorrect passive fire protection, loose unsecure fire damper, etc. Fire dampers should always be independently supported to the fabric of the building. |

**All reports must be kept as part of the Fire Safety Manual and kept to show a full record of testing and actions.**

## 4.8 AN EXAMPLE OF A FIRE DAMPER REPORT

**NAADUK HAS SOFTWARE FOR THE INSPECTION OF FIRE DAMPERS FREELY AVAILABLE. CONTACT NAADUK FOR MORE INFORMATION.**

**Fig No. 6 — Minimum Report Standard**

| Site | | Location | |
|---|---|---|---|
| FD number / Barcode: | | Date: | |
| System type: | | Manufacturer/ type: | |
| **Inspection and Maintenance Report** | | | |
| Is the damper accessible for maintenance? | | Is the damper fitted as per manufacturers fitting instructions? | |
| Is the damper fitted well into the barrier as per tested method? | | Does the fire damper have any obstructions? | |
| Is the damper mechanically intact? | | Damper cleaned and lubricated as per Manufacturer's instructions? | |
| Is the surrounding fire compartment free from damage? | | Damper mechanism checked? | |
| Is the fire damper free from corrosion? | | Damper dropped and reset? | |
| Level of fouling at damper? | | Damper Size? | |
| | | | |
| | | | |
| **Pass / Fail** | Reason: | Further actions / advisory notifications: | |

# 5 FAILURES

## 5.1 WHAT CAUSES FAILURES?

As part of a compliance service, fire damper failures will be found in some systems. All failures must be reported and acted on in keeping with the statement taken from **BS 9999 Annex W Note 1**. "Repaired or replaced immediately if found to be faulty." Below is a table showing the most common failures but it is not an exhaustive list, also be aware that a fire damper might have several types of failure on an individual unit.

**Table No. 4 — Failure Causes**

| FAILURE TYPE | DESCRIPTION | EXAMPLE |
|---|---|---|
| **Operation** | When the damper fails to operate in the manner in which it was intended due to damage etc. |  |
| **Orientation** | If the damper is the wrong way to test and reset, not in the correct airflow direction or not working with gravity. |  |
| **Obstruction** | An item is within the damper that stops the blades from reaching a fully closed position. |  |
| **Access** | Restricted access from other services. No access or incorrect access installed to gain entry to the ductwork for testing. |  |

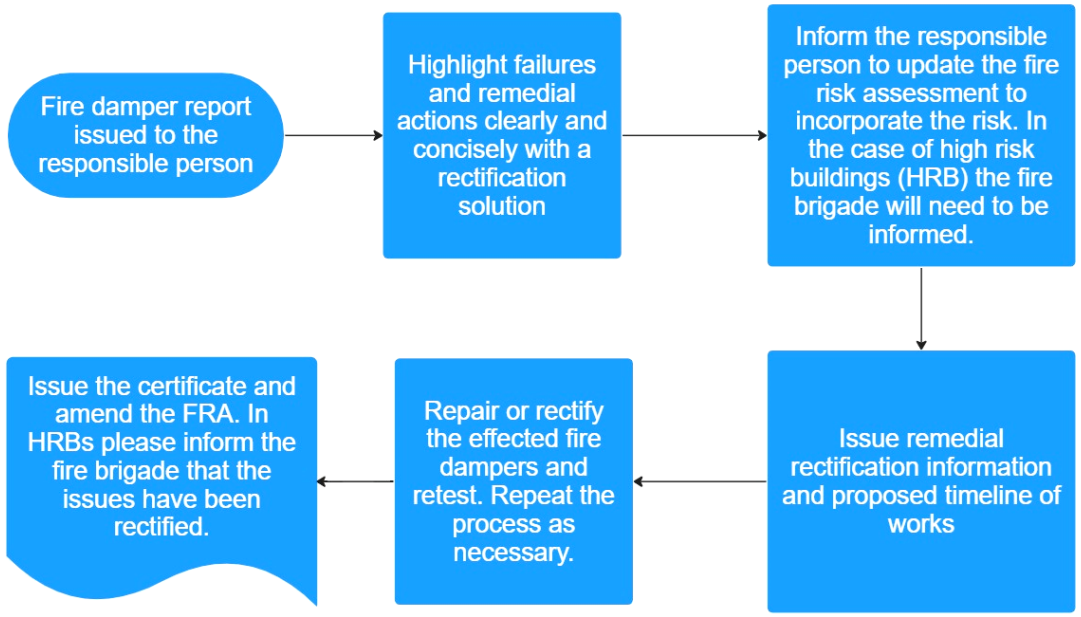
| FAILURE TYPE | DESCRIPTION | EXAMPLE |
|---|---|---|
| **Compartmentation** | Breaches within the fire compartment that the fire damper is designed to protect. The fire damper itself may pass the drop test but the system in which it is installed is a failure. Check if it is installed to the manufacturers detail. |  |
| **Corrosion** | Where the atmospheric elements have caused corrosion in the unit affecting the performance of the unit which results in needing a replacement. |  |
| **Installation** | Any fire damper that has not been installed as per the manufacturers fitting instruction is a failure as it must be a tested and approved method of installation. |  |
| **Fire Damper Not in the Plane of the Wall or Floor** | Unless it has a tested and approved installation method. |  |

**All fire damper failures are classed as critical as fire dampers are a LIFE SAFETY SYSTEM and should be reported as such to the client/responsible person.**

## 5.2 WHAT SHOULD YOU DO WITH FAILURES?

It is the responsibility of the fire damper tester and inspector to inform the responsible persons that there are failures present within their systems. As a result, there are several actions that need to be taken. Always ask the responsible person to give a copy of the report to their risk assessor failure or no failures.

**Fig No.7 — Failure Process Map**




**The responsible person has this duty as stated in RRFSO:2005 Section 9 of the as shown below:**

**(1) The responsible person must make a suitable and sufficient assessment of the risks to which relevant persons are exposed for the purpose of identifying the general fire precautions they need to take to comply with the requirements and prohibitions imposed on him or her by or under this Order.**

**(2) Where a dangerous substance is or is liable to be present in or on the premises, the risk assessment must include consideration of the matters set out in Part 1 of Schedule 1.**

**(3) Any such assessment must be reviewed by the responsible person regularly so as to keep it up to date and particularly if**

**(a) there is reason to suspect that it is no longer valid; or**

**(b) there has been a significant change in the matters to which it relates including when the premises, special, technical and organisational measures, or organisation of the work under go significant changes, extensions, or conversions.**

**and where changes to an assessment are required as a result of any such review, the responsible person must make them.**

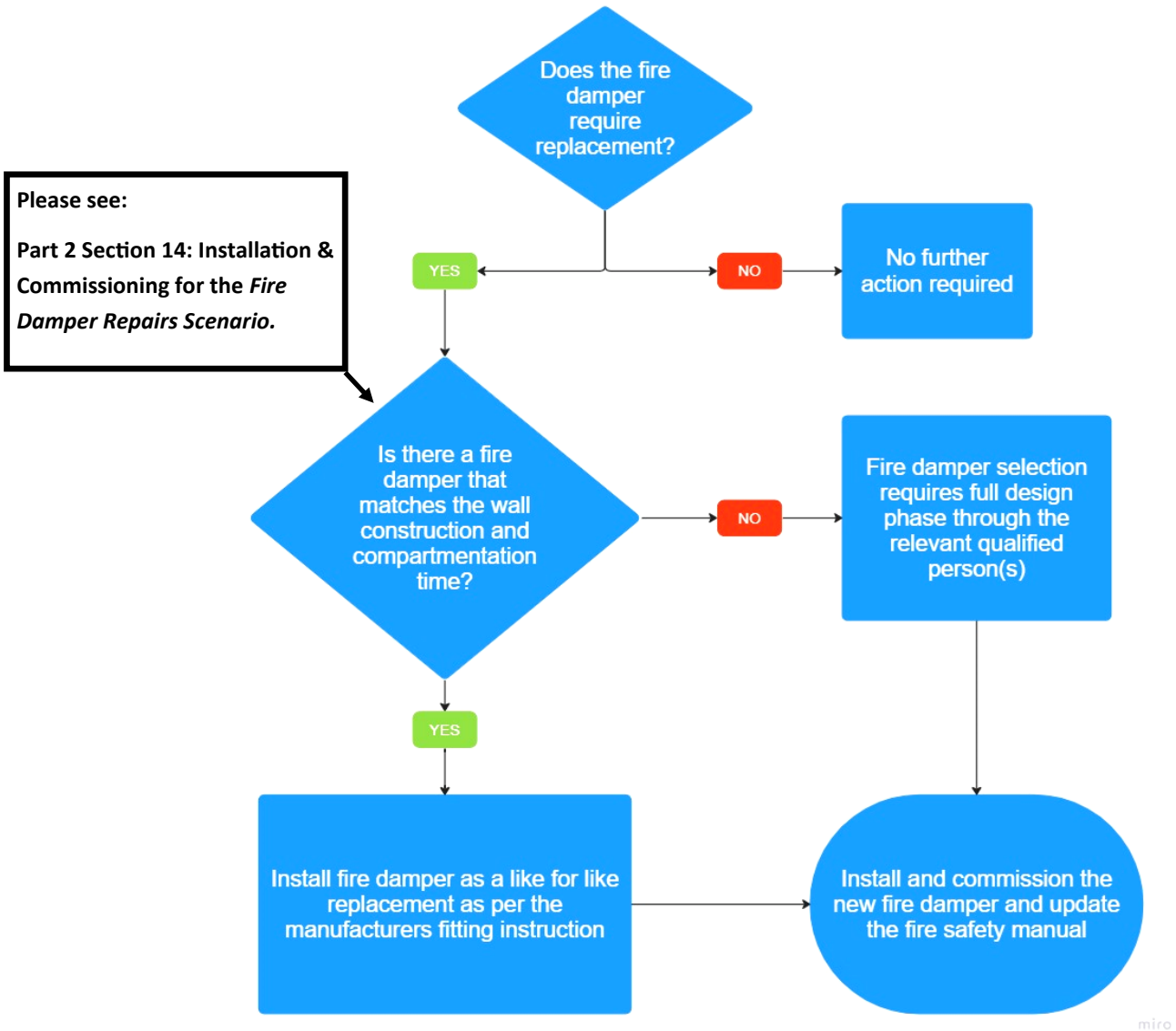
**The *Responsible Person* does have the power and the right to appoint another qualified competent person to complete the remedial works identified in a testing report. The *Responsible Person* will use the combined reports to show compliance in the premises and they have shown due diligence.**

# 6 FIRE DAMPERS - RECTIFYING FAILURES

## 6.1 GENERAL

When fire damper testing is being undetaken fire dampers can fail the operation aspect of the test and may require replacing. It is imperative that the process is followed to meet the compartmentation strategy for the building.

**Fig No. 8 — Fire Damper Replacement Process Map**



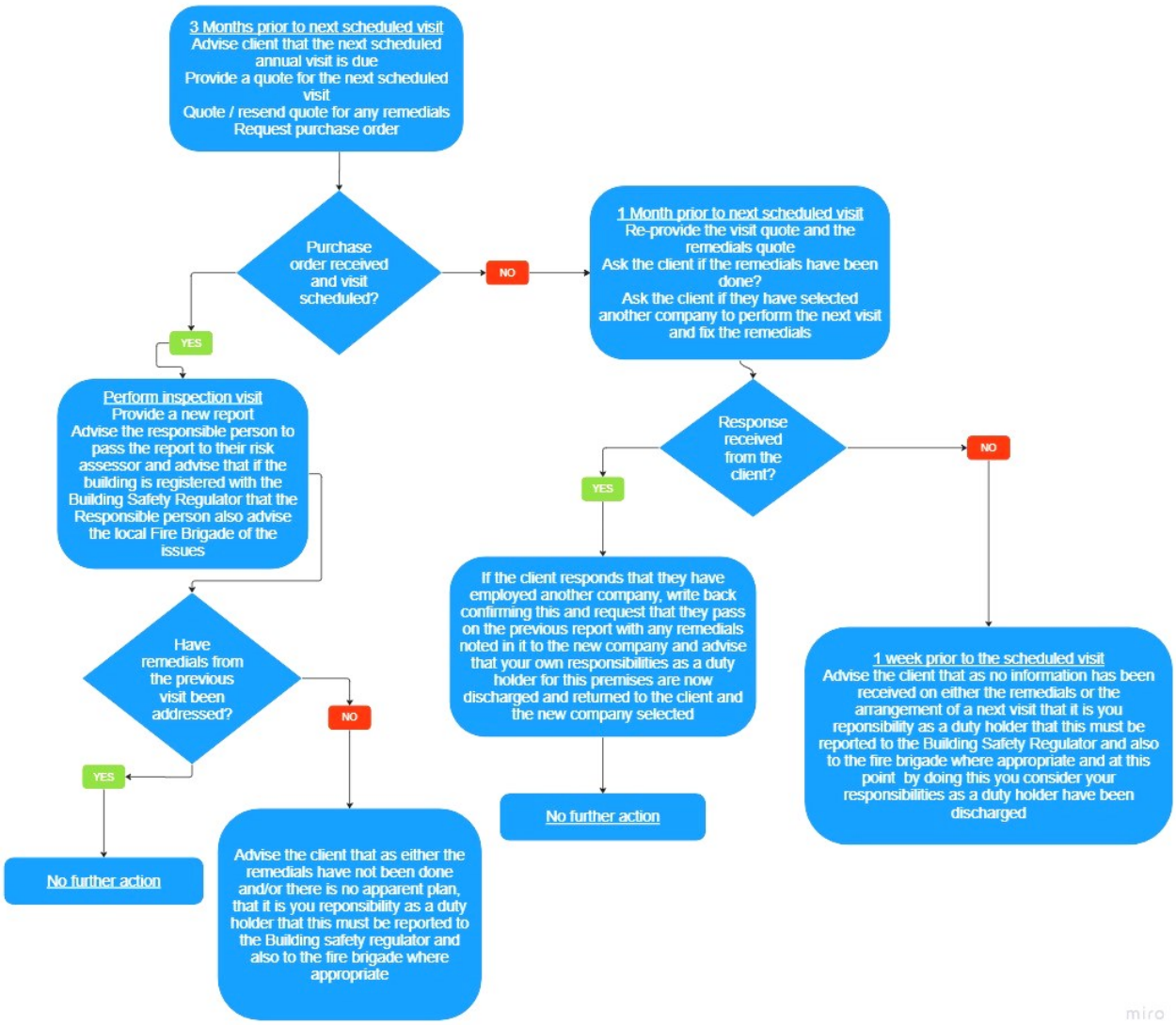

**The fire damper must meet the wall construction and compartmentation time. If there is no adequate replacement, a compartment redesign required.**

**A building designed for fire safety should not be compromised by the addition of combustible products or by removal or damage to existing systems. The risk of spread of fire externally over a building should be considered. Materials used for repair or modification should not impair the fire safety strategy.**

## 6.2 IF A RESPONSIBLE PERSON DOES NOT REPAIR FAILURES?

If the responsible person does not complete the remedial actions through the testing company or fails to instruct another company to complete these works, then as a competent person you have a responsibility to report the failure (as per Fig No. 9).

**Fig No. 9— Suggested Reporting Procedure**




If the responsible person is not actioning the fire damper remedials or trying to not action any rectification works then this is a breach of their duties and they should be reported to the **Fire Safety Officer or Building Safety Regulator (BSR) from January 2023.**

**In all aspects a responsible testing provider SHOULD work with the responsible persons to get a premises compliant.**

# 7 EXAMPLES OF FIRE DAMPER NON-COMPLIANCE

## 7.1 OBSTRUCTIONS

**Fig No. 10— Obstruction to Access Panel and Fire Damper Not Sealed Correctly**

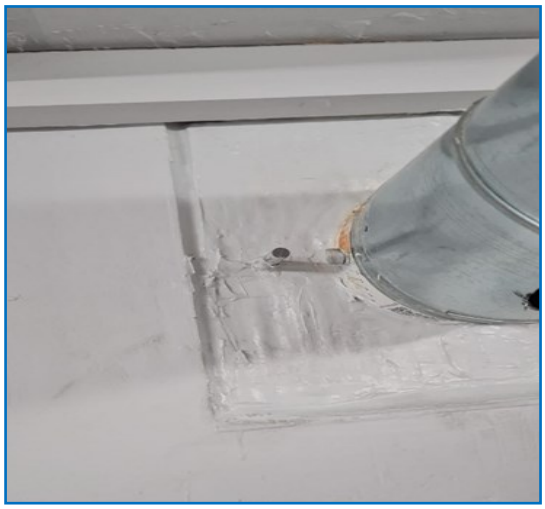


**Fig No. 11— Fire Batt Obstructing Damper Operation**

**Fig No. 12— Fire Batt Incorrectly Installed**

## 7.2 INCORRECT INSTALLATIONS

**Below are some examples of incorrect installations to be aware of and avoid.**

**Fig No. 13 — Damper fixed not by shearable fixings link and obstructed by bolt**

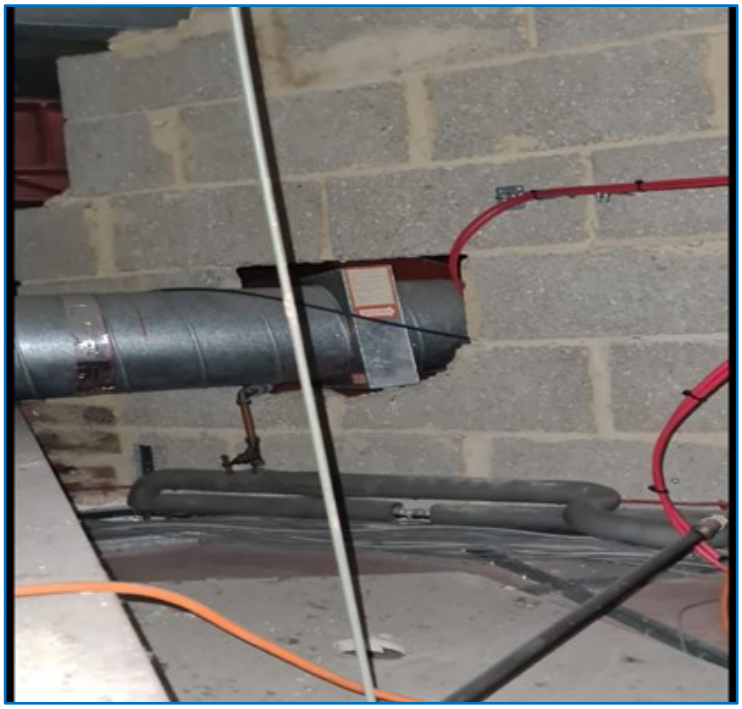
**Fig No. 14 — Not to manufacturers specification must be a proper link**


**Fig No. 15— Damper not in wall**


**Fig No. 16 — Rivet through link. Unable to drop test**

## 7.3 COMPARTMENTATION BREACHES

**Fig No. 17 — Damper not fixed**



**This is an example of a damper that is not fixed in the wall, is not parallel, not supported and not sealed.**

**Fig No. 18 — Incorrect Installation**

**Example of a poor installation**

## 7.4 ACTUATOR PROBLEMS

**The below items are elements to look out for:**

**Fig No. 19— No drive shaft connecting the actuator to the fire damper**

**Fig No. 20— Actuator not correctly installed to the fire damper**


**Fig No. 21— Cables not connected and damper left open**

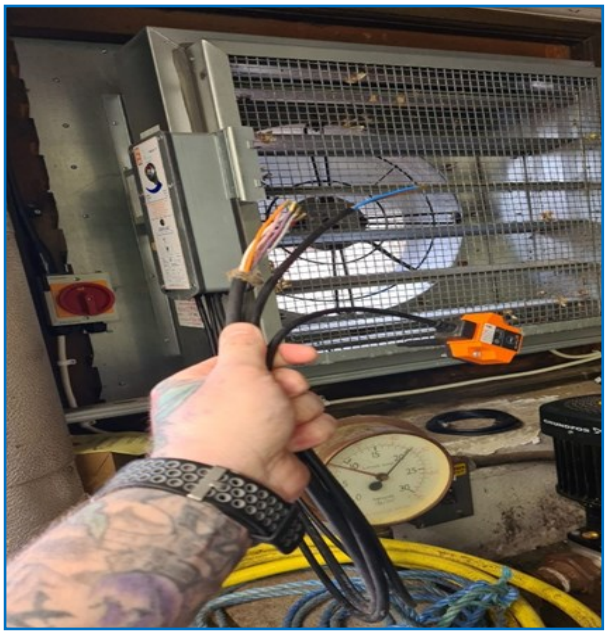


**Fig No. 22— Cables not connected and damper left open**

**These errors will all give false reading on control and feedback panels**

## Obstructions in Actuators

**Fig No. 23— Plunger not aligned to the connecting bar and the retaining pin is missing**

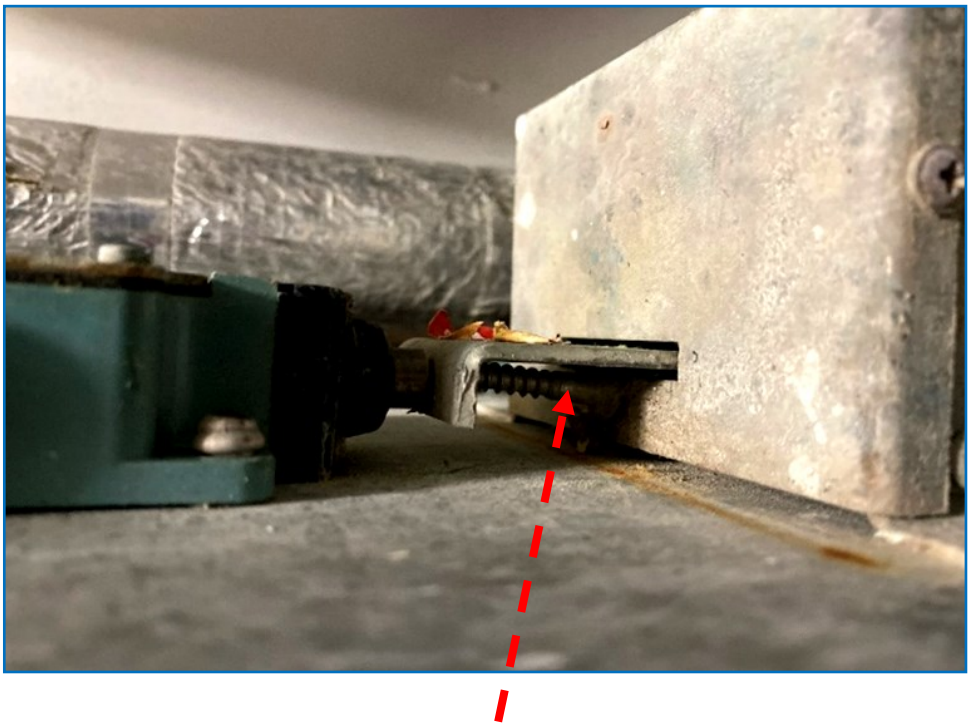


**Fig No. 24— Screw overriding function of the actuator**

## 7.5 MISCELLANEOUS

Fig No. 25— Fusible element will not operate at correct temperature due to insulating effect of debris

Fig No. 26— Excessive dust can cause fire to pass through damper before actuation

Fig No. 27— Damaged or twisted spring will prevent correct operation

Fig No. 28— Incorrect installation (tek screws) and orientation of fire damper (closing upwards)

Fig No. 29— Dust in link could result in no actuation

## PAGE FOR OWN NOTES:

PART 2

# PART 2:
# Installation, Testing & Commissioning

# PART 2 — INSTALLATION, TESTING & COMMISSIONING

# 1 INTRODUCTION TO FIRE DAMPER INSTALLATION AND EXPANSION DETAILS

Fire Dampers are an integral part of the fire protection systems that ensure compartmentation in the event of a fire. It is crucial that the initial design and subsequent installation is completed to the highest standard to protect human life.

Guidance around installation and commissioning can be found in **BS 9999, DW:145, DW:144, Approved Document B and Manufacturers Installation Operation Manuals (IOMs).** This guidance can and should be considered, as following it will fulfil the minimum requirements set out in **Building Regulations and the Regulatory Reform (Fire Safety) Order 2005**.

This document will take you through the processes and guidelines that are required during the installation and commissioning process.

In all situations we must remember that:

**FIRE DAMPERS ARE PART OF A LIFE SAFETY SYSTEM**

***Life Safety System Definition— applies to any system incorporated into a building where the purpose is the protection and preservation of human life during an emergency***

Please refer to Installation frame for fire dampers complying with the requirements of the Greater London Council (HEVAC 6/5/83 Rev 2 March 2012) for a comprehensive overview of the details for lateral expansion.

The fire dampers have a short connection to connection length, often 150mm. So, taking the standard calculation this face-to-face dimension will increase by approximately 2 mm which is negligible.

However, the side of a large fire damper (say 1000mmm) will expand the same amount as the hangers, approximately 14mm.

In flexible walls this is often taken up by movement and the penetration seals.

In solid wall, a fire damper that uses a HEVAC frame was designed with elements that collapse on themselves. The damper is supported in the outer frame with some sacrificial channels to allow the damper to expand. The outer frame sections of the outer frame are shorter than overall and fitted into the corners with aluminium rivets that shear – allowing expansion of everything into the solid hole corners.

**HEVAC 6/5/83 Rev 2 March 2012 Section 1.4—The installation frame is designed to maintain integrity between it and the fire damper casing. The aluminium rivets where used in the construction of the installation frame shall not inhibit expansion of the frame components under fire conditions.**

**HEVAC 6/5/83 Rev 2 March 2012 Section 3.3— Each corner fixing bracket of the installation frame shall be open, with a clearance space for expansion. These corner brackets shall be preformed from galvanised sheet steel of a minimum nominal thickness of 1.5mm as tested. Each corner bracket shall be fixed to the installation frame by four 5mm diameter aluminium rivets or as tested. For small dampers, it may be necessary to modify corner bracket (reduce size) and also reduce quantity of rivets from four to three or two as required.**

# 2 FIRE DAMPER INSTALLATION RESPONSIBILITY

It is the responsibility of the designer to ensure the fire damper and all structural elements are correct for the compartment strategy on a project. The designer is responsible for providing the installation company and person with the following:-

This includes:

- Manufacturers' data sheets and dimensions with detailed technical illustrations.
- Performance characteristics and associated controls specification.
- Materials' specification and critical dimensions.
- Project-specific detail including relationship of damper with fire barrier, connection to ductwork, damper supports, and expansion arrangements around damper. This would include detailed fitted drawings.

**Section 3: Design for and selection of Fire Dampers** provides a list of technical information that the **system designer** should provide to the damper installation company.

However, when it comes to the construction phase of a project that responsibility is shared with the construction management as stated in **BS:9999 7.3:**

**"The construction management is responsible for quality monitoring during construction. Where there are a variety of different trades working on a building there might be serious interference by a later tradesperson. For example, a ventilation engineer might compromise previously installed structural passive fire protection which obstructs a new ducting system. Where it might not be reasonable to expect all contractors to understand the needs of the fire safety strategy or take responsibility for them, it might be necessary to develop procedures to integrate different trades and to allocate responsibility and accountability or appoint an independent supervisor."**

**As an installer if you are not supplied with all the required information—STOP!!**
**Request the documents as it is a requirement.**

# 3 WHERE SHOULD A FIRE DAMPER BE SITUATED AND HOW?

Fire dampers are a critical part of a buildings fire strategy and as such should installed at certain locations and using a specific method. This information is often referred to as the **Installation Operation Manual (IOMs).**

Fire dampers should be installed as part of the compartmentation according to the fire strategy.

Fire dampers are classed as an element within the compartmentation strategy and utilise all related guidance and legislation the key points are the following.

**Approved Document B Vol 2 Section 8.4**

**Effective compartmentation relies on both of the following:**

a. **Fire resistance should be continuous at the join between elements forming a compartment.**
b. **Any openings between two compartments should not reduce the fire resistance.**

**Approved Document B Vol 2 Section Installation and specification of fire dampers**

**10.11 Fire dampers should be situated within the thickness of the fire-separating elements and be securely fixed. It is also necessary to ensure that, in a fire, expansion of the ductwork would not push the fire damper through the structure.**

**10.12 Adequate means of access should be provided to allow inspection, testing and maintenance of both the fire damper and its actuating mechanism.**

**10.17 In addition to any other provisions in this document for fire-stopping:**
**a. joints between fire-separating elements should be fire-stopped; and**
**b. all openings for pipes, ducts, conduits or cables to pass through any part of a fire- separating element should be:**
**i. kept as few in number as possible; and**
**Ii. kept as small as practicable;**

And

**BS:9999 Section 32.5.2.5 Installation and specification of fire dampers**
**Fire dampers should be situated within the thickness of the fire-separating element. To ensure that the damper will not be displaced by movement or collapse of the duct, dampers should be securely fixed and provided with breakaway joints in accordance with manufacturer's instructions.**

**Fire dampers may be installed on the surface of the wall or away from the wall providing that the manufacturer can provide a tested installation method.**
**This installation method should be followed comprehensively including the installation of the ducting at the wall .**

Manufacturers provide IOMs for all models, free of charge. These can be downloaded from the manufacturers' websites.

## 3.1 MINIMUM INSTALLATION CLEARANCES

**EN 1366-2** states that the minimum clear separation between fire damper cases installed in separate ducts is 200mm. This means that two dampers installed in separate duct runs cannot be any closer than 200mm unless tested otherwise.

**Fig No. 1— Minimum Clearances**

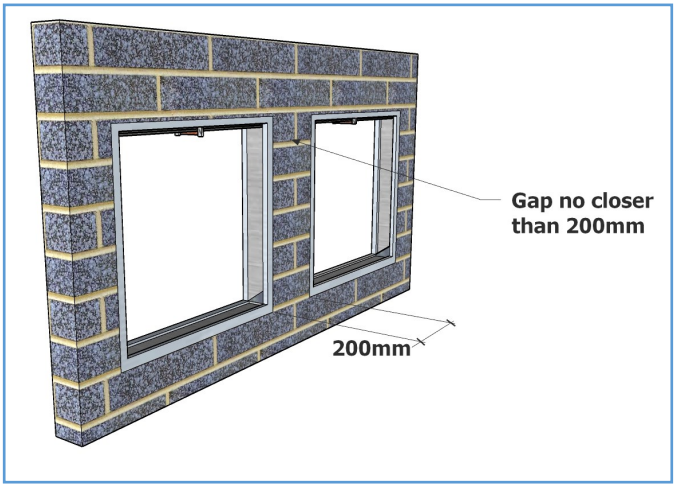
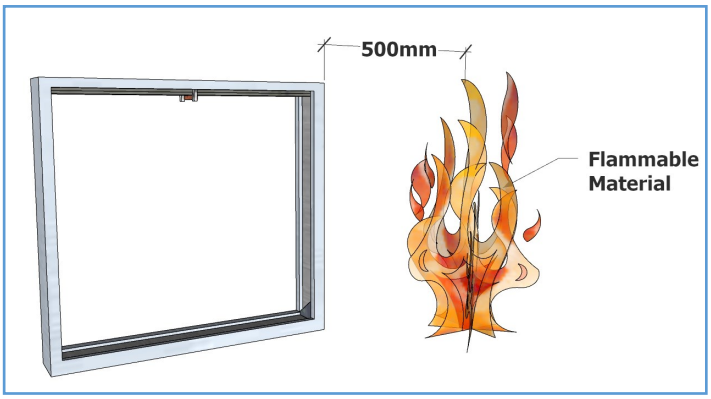
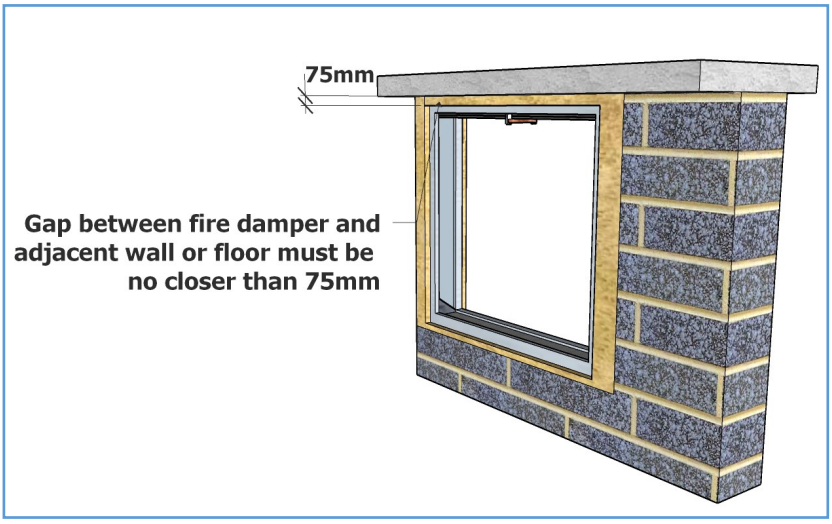



**Fig No. 2— Distance to flammable material**




Materials of a combustible nature must not be incorporated into a ductwork system within 500mm of a fire damper assembly.

**Fig No. 3— Adjacent wall and floor**




**EN 1366-2** also states that there should be no less than 75mm between the damper and an adjacent wall or floor. This means that a damper cannot be closer than 75mm to the soffit/ ceiling above it, or to a wall adjacent to it.

**Each damper should have its own penetration, and cannot share hole with other services unless tested otherwise**

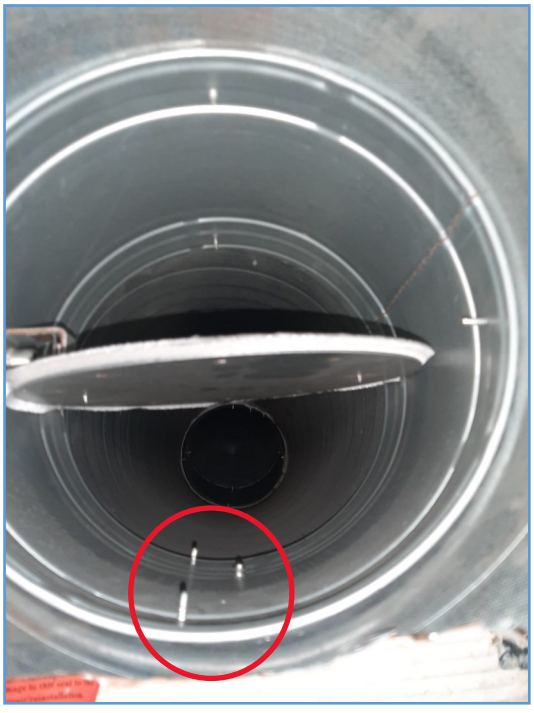
## 3.2 SELF-DRILLING SCREWS (TEK SCREWS)

One of the main installation defects on fire dampers is the presence of self-drilling screws AKA Tek screws. On most installations this does not affect the activation of the fire damper but it will affect the separation of the ductwork and does not conform to the manufacturer's fitting instructions. NAADUK acknowledges that the cost to rectify these can be substantial and needs to be planned to minimise the impact on clients.

All TEK screws require removing but the most effective way to achieve this and minimise costs to building owners is to replace as part of the maintenance regime. These defects need to be reported to the relevant persons and recorded on the risk assessment until they are replaced. The compartmentation time may be affected based off lateral expansion and the potential dislodgment of the damper at temperatures that exceed 632°C which is when the desired aluminium rivets separate.

All installations must meet the tested and approved methods stipulated by the manufacturer and removal of TEK screws might require the addition of extra supports if being replaced with plastic pop rivets.

**Fig No. 4 & 5 — Tek Screws**



## 3.3 FIRE DAMPERS— FLANGED

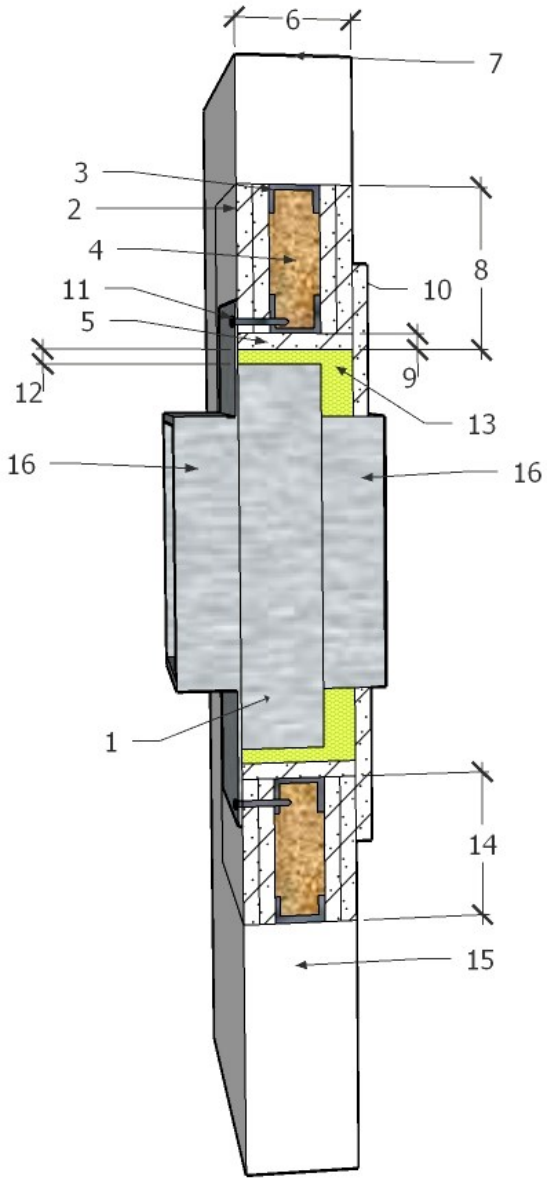
### 3.3.1 GENERAL

Flanged Dampers are made by some manufacturers and they can be either MFD's or FD's. These fire dampers, generally, are installed by screwing the flange into the supporting stud work of the wall system, which need to be verified as being able to take the weight and the size. They could also be installed within a rigid structure if the damper has been tested within a flexible wall under the direct field of application (DIAP) rules. They will be supplied with two sets of screw holes, one for drywall and one for rigid applications. Installation access is generally from both sides and the penetration seal is normally completed by the drywall contractor or the PFP contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 3.3.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 6—Fire Dampers—Flanged**



### 3.3.3 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 6**

| | |
|---|---|
| **GENERAL—FLANGED** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture (lining out), type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of the aperture (lining out) board |
| 10 | Penetration Seal Pattress detail information. Material, thickness, fixings screws, mastics and Length |
| 11 | Damper fixing details including the screw types, any drop rods supports and positions. |
| 12 | Penetration Seal Pattress detail information. Maximum and minimum depths. |
| 13 | Penetration Seal Fill detail information. Material, density, thickness, mastics and depth. |
| 14 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 15 | Type of construction that the wall is attached to and its classification information |
| 16 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classification requires power and fire alarm interfaces. |
| | **RELATIONSHIPS** |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides [Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 3.4 FIRE DAMPERS— CAST IN

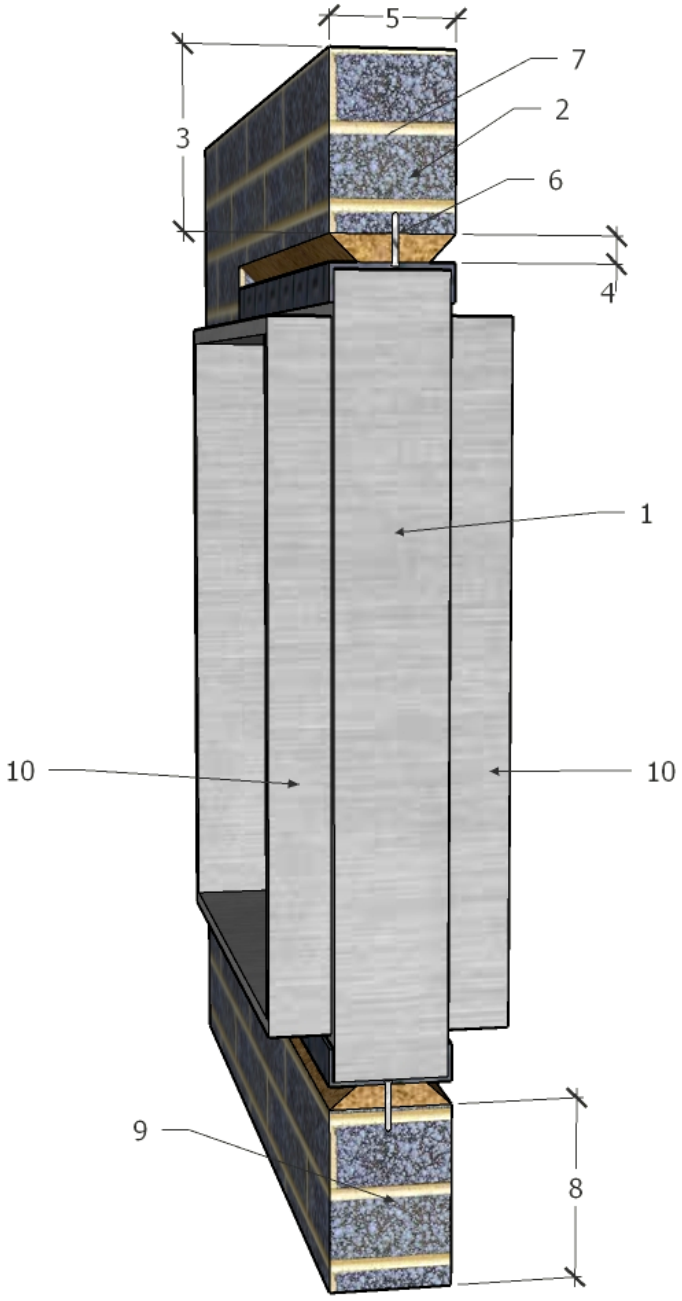
### 3.4.1 GENERAL

HEVAC Frame dampers are made by some manufactures and they can be either MFD's or FD's. These dampers generally cast into rigid constructions using a 4:1 sand and cement mix and cannot be used in flexible constructions under the DIAP rules. They have specific tolerances around the damper to the supporting constructure that needs to be accounted for within the design. Installation access is from both sides and the penetration seal is generally completed by the blockwork contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 3.4.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 7— Fire Dampers—Cast In**



## 3.4.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 7**

| No. | GENERAL - CAST IN |
|---|---|
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information (rigid walls concrete or block/brick) |
| 3 | Deflection details. The rigid wall deflection head size for the wall to be fire safe |
| 4 | Type of penetration seal used, thickness and density. |
| 5 | Thickness of the wall. |
| 6 | Insert pins into the construction and wire back to the damper builders ties |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 9 | Type of construction that the wall is attached to and its classification information |
| 10 | Details of the break away joint materials. |
| | **PENETRATION INSTALLATION** |
| **a** | Access required from both sides |
| **b** | Infill material 4:1 sand/cement |
| | **PRESCRIPTIVE** |
| **c** | Identify the space that the Fire Damper serves and whether it requires an E or an E.S classification |
| **d** | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| **e** | S classifications require power and fire alarm interfaces. |
| | **RELATIONSHIPS - SEE FIGURE** |
| **f** | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| **g** | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| **h** | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| **i** | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| **j** | Wall thickness. As defined by the gap seal depth (5) through the wall within the damper test. Cannot be less |
| **k** | Aperture size depth within the wall (4) must be as the damper test limits |
| **j** | Wall thickness. As defined by the gap seal depth (5) through the wall within the damper test. Cannot be less |
| **k** | Aperture size depth within the wall (4) must be as the damper test limits |
| **l** | Deflection: Applicable to the flexible wall manufacturers requirements (3) for the fire safety of the wall. |
| **m** | No Deflection: Applicable to the flexible wall manufacturers requirements (3) for the fire safety of the wall. |
| **n** | Wall |
| **o** | 3 sided installation: No |
| **p** | Break away joints as manufacturers IOM |
| | **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** |
| **i** | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| **ii** | Fire damper mounted within the aperture [Q] |
| **iii** | Wall penetration seal pictures both sides[Q] |
| **iv** | Break away joints and TR 19 Access hatches [Q] |
| **v** | Any motor, power and connections and ductwork Insulation [Q] |
| **vi** | Drop Test [Q] |
| **vii** | Final installed unit complete within the wall [B] |

## 3.5 FIRE DAMPERS— ABLATIVE BATT

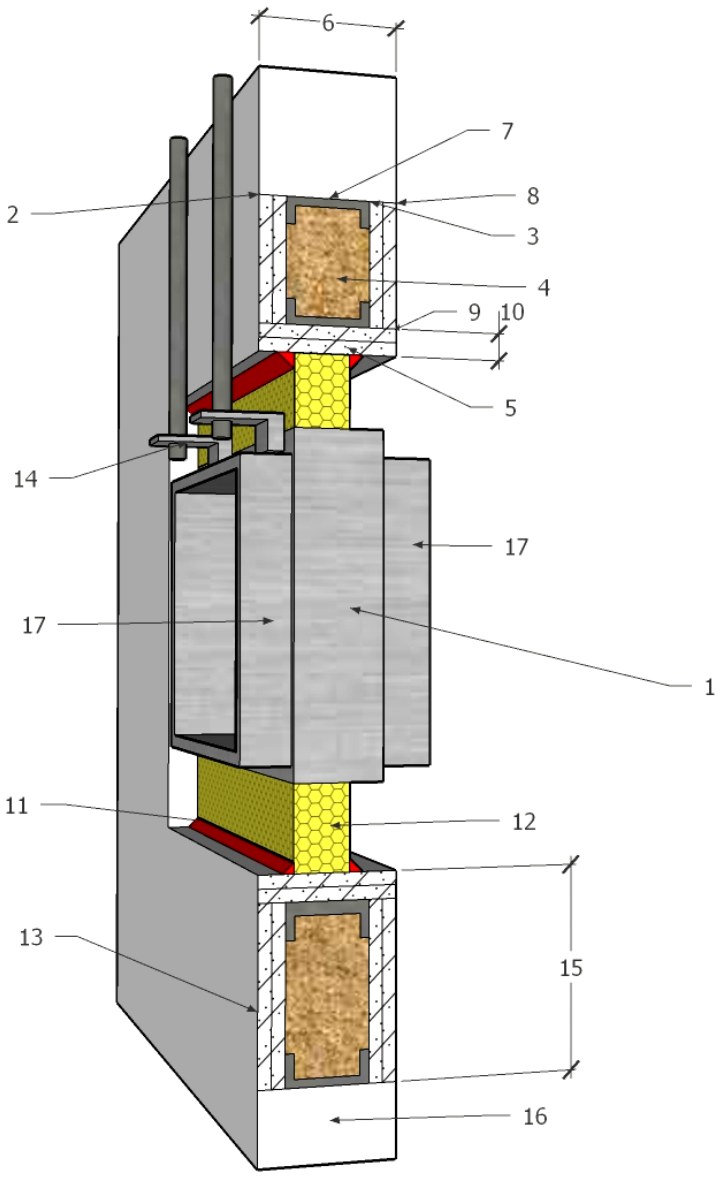
### 3.5.1 GENERAL

Ablative Batt penetration seal solutions for fire dampers are provided by some manufacturers and they can be either MFDs or FDs. With hanger support these fire dampers may be installed in different wall types in an oversize hole with the penetration seal being formed with ablative batt. Installation access is generally from both sides and the penetration seal is normally completed by the drywall contractor or the PFP contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 3.5.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 8— Fire Dampers—Ablative Batt**



## 3.5.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 8**

| | |
|---|---|
| **GENERAL - ABLATIVE BATT** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture (lining out), type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of the aperture (lining out) board, number of boards |
| 10 | Penetration Seal depth information. |
| 11 | Damper seal sealant details, type, classification, thickness applied. |
| 12 | Penetration Seal material type, thickness, fixings, coatings and Length |
| 13 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 14 | Damper support connection information. Dual nuts or single and size. |
| 15 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 16 | Type of construction that the wall is attached to and its classification information |
| 17 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the Fire Damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Fire damper |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (10) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 3.6 FIRE DAMPERS— GYPSUM MORTAR

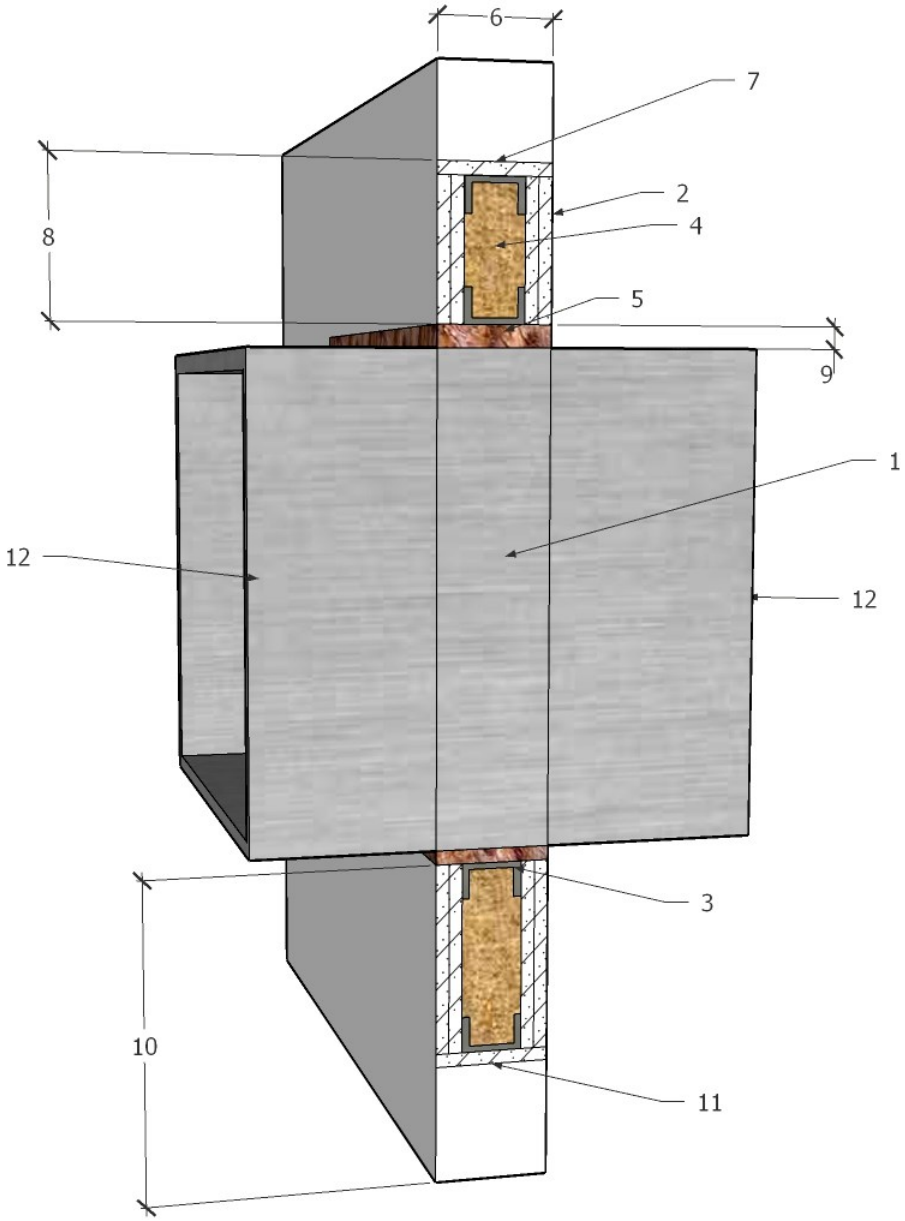
### 3.6.1 GENERAL

Gypsum plastered in penetration sel solutions for fire dampers are provided by some manufacturers and they can be either MFD's or FD's. These dampers can generally be installed into flexible walls using gypsum plaster. This is not the same as refractory compounds and advice should be sought from the fire damper manufacture. If they are tested within a flexible wall, they could be used in a rigid construction under the DIAP rules. Installation access is from both sides and the fire seal is normally done by the drywall contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 3.6.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No.9 —Fire Dampers—Gypsum Mortar**



## 3.6.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 9**

| | |
|---|---|
| **GENERAL—GYPSUM MOTAR** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Material used within the aperture and its density |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of plaster material required |
| 10 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 11 | Type of construction that the wall is attached to and its classification information |
| 12 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classification require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 3.7 FIRE DAMPERS— REVERSE DEFLECTION HEAD

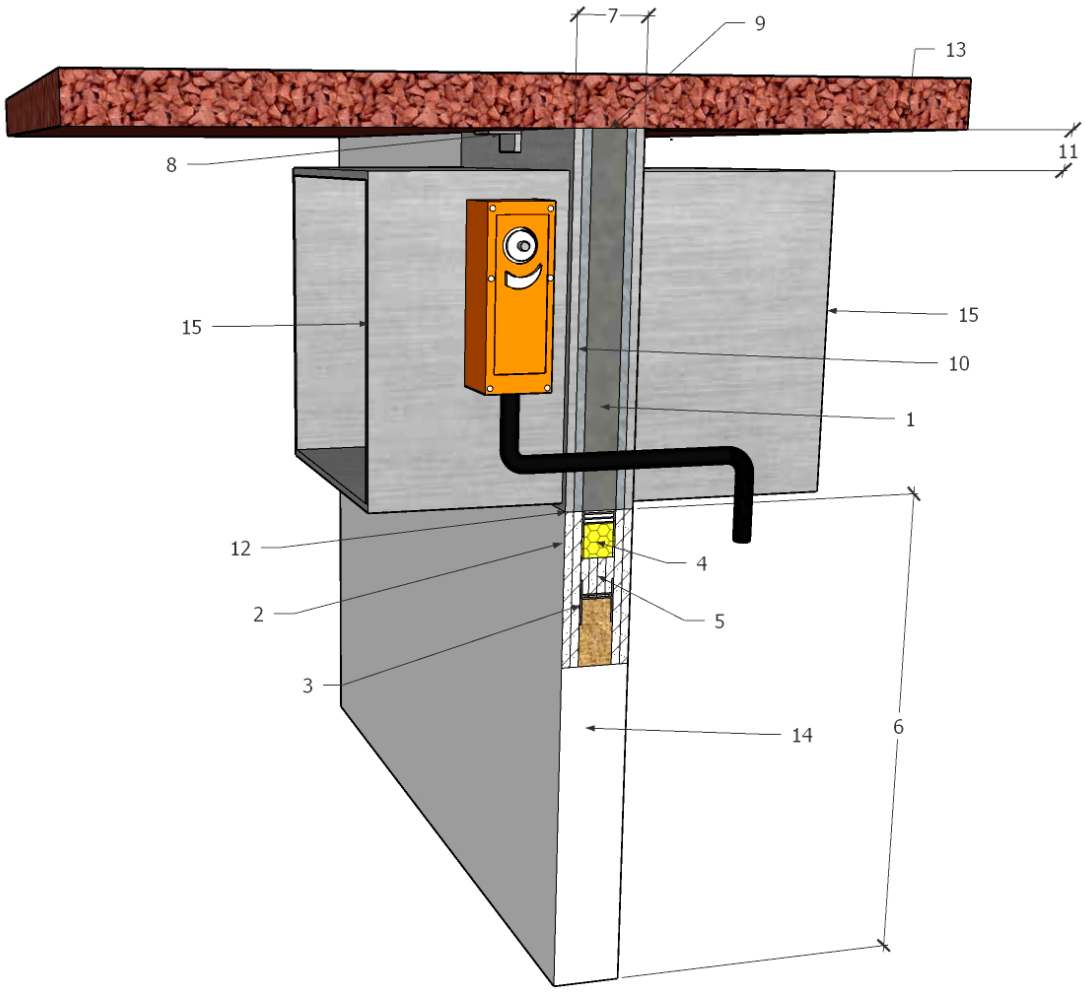
### 3.7.1 GENERAL

Reverse deflection head dampers are provided by some manufacturers and they are normally MFD's only. These dampers are generally soffit fixed into the concrete slab and are sealed within the wall aperture generally using a specialist installation kit supplied with the fire damper. They are tested within a flexible wall but cannot be installed into rigid structures, as the deflection head must be moved below the damper into the wall void. The materials used for the infill kit are specific to the manufacturer, they are not to be treated as generic. Installation access is from both sides and the work must be carried out by a competent drywall contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 3.7.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 10— Fire Dampers—Reverse Deflection Head**



## 3.7.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No**. **10**

| | |
|---|---|
| **GENERAL—REVERSE DEFLECTION HEAD** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture, type of board, layers, thickness. |
| 6 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 7 | Thickness of the wall. |
| 8 | Deflection details. Top details fixed from the deflection kit |
| 9 | Seal material, density and type |
| 10 | Damper deflection kit (specific to manufacturer) |
| 11 | Depth of allowable deflection (specific to manufacturers kit) |
| 12 | Penetration Seal Material type, thickness, fixings, coatings and Length etc (specific to manufacturer) |
| 13 | Type of construction that the wall is attached to and its classification information |
| 14 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 15 | Details of the break away joint materials. |
| PENETRATION INSTALLATION | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| PRESCRIPTIVE | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 3.8 FIRE DAMPERS— BUILD IN CLEATS

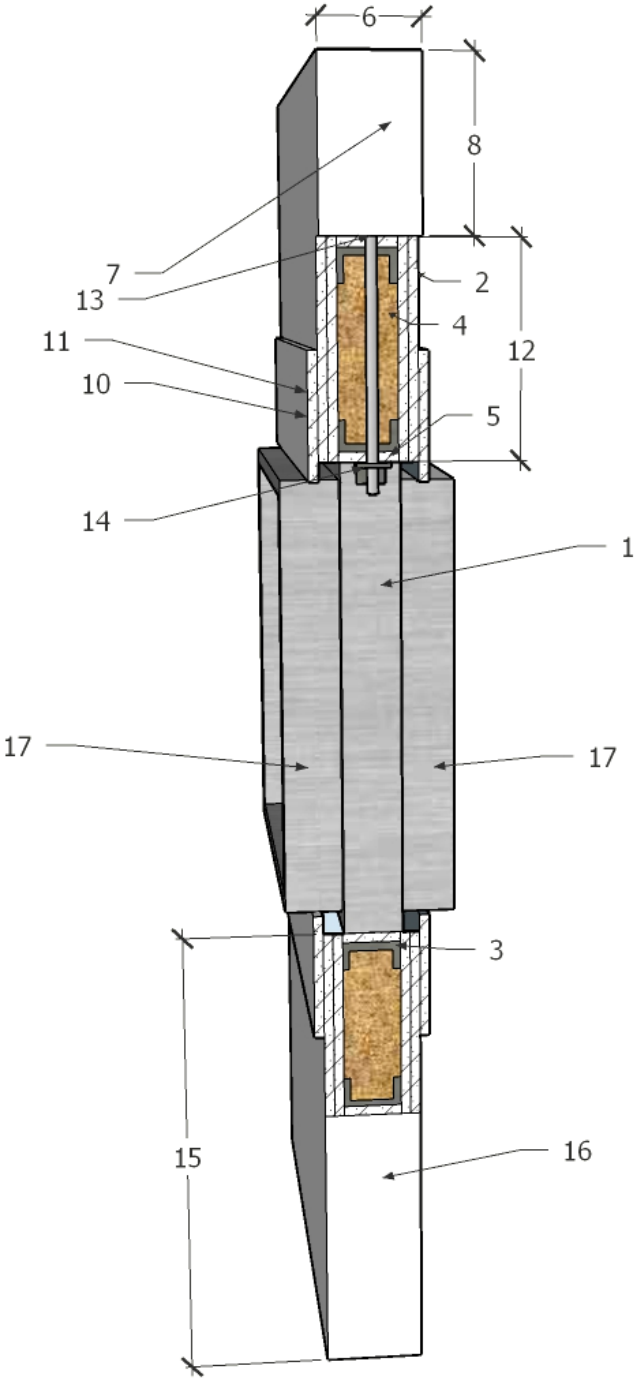
### 3.8.1 GENERAL

Fire dampers with cleats are supplied by some manufacturers and they can be either MFD's or FD's. These fire dampers are generally installed by supporting the fire damper with cleats and hangers within the flexible wall line. The flexible wall is then built around the fire damper. Installation access is generally from both sides and the penetration seal is normally complied by the drywall contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 3.8.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 11— Fire Dampers—Build In Cleats**



## 3.8.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 11**

| | |
|---|---|
| **GENERAL - BUILD IN CLEATS** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture, type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Thickness of the construction. i.e. slab or lintel. Rigid generally only used. |
| 9 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 10 | Penetration Seal Pattress detail information. Material, Density, Thickness, mastics and depth. |
| 11 | Pattress fixing type. Type length etc. |
| 12 | Penetration seal depth. |
| 13 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 14 | Damper support connection information. Dual nuts or single and size. |
| 15 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 16 | Type of construction that the wall is attached to and its classification information |
| 17 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| QUALITY HOLD POINTS [Q] AND **BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 3.9 FIRE DAMPERS— ON WALL SURFACE

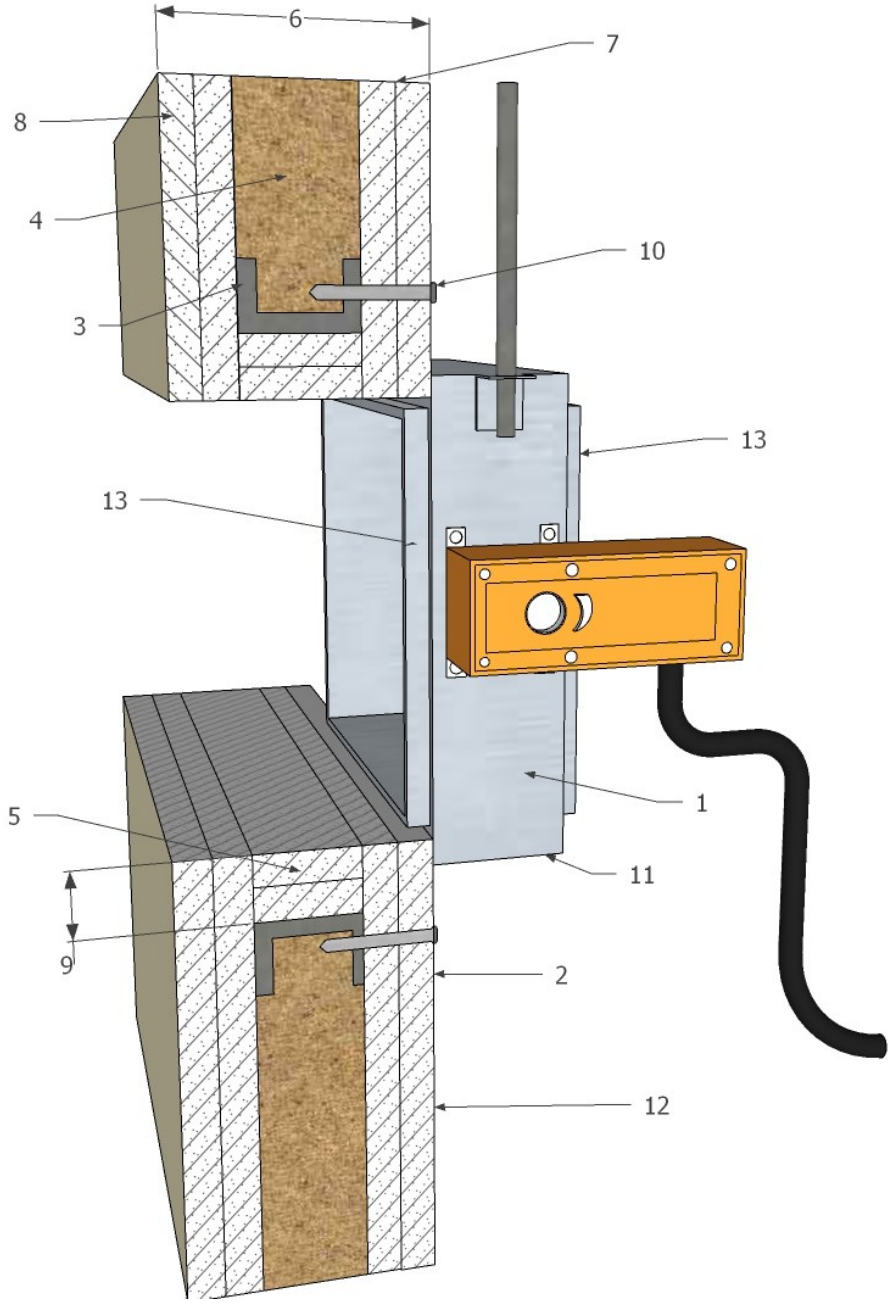
### 3.9.1 GENERAL

Wall surface fire dampers are provided by some manufacturers and they can be either MFD's or FD's. These fire dampers are generally installed by fastening the flange onto the wall construction with the fire damper out of the wall, additionally supported with hangers. They could also be installed within a rigid structure if the damper has been tested within a flexible wall under the DIAP rules. Installation access is generally from both sides and the fire seal is normally done by the ductwork, drywall contactor or the PFP contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 3.9.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 12— Fire Dampers—Wall Surface**



## 3.9.2 WHAT NEEDS TO BE CHECKED AND RECORDED

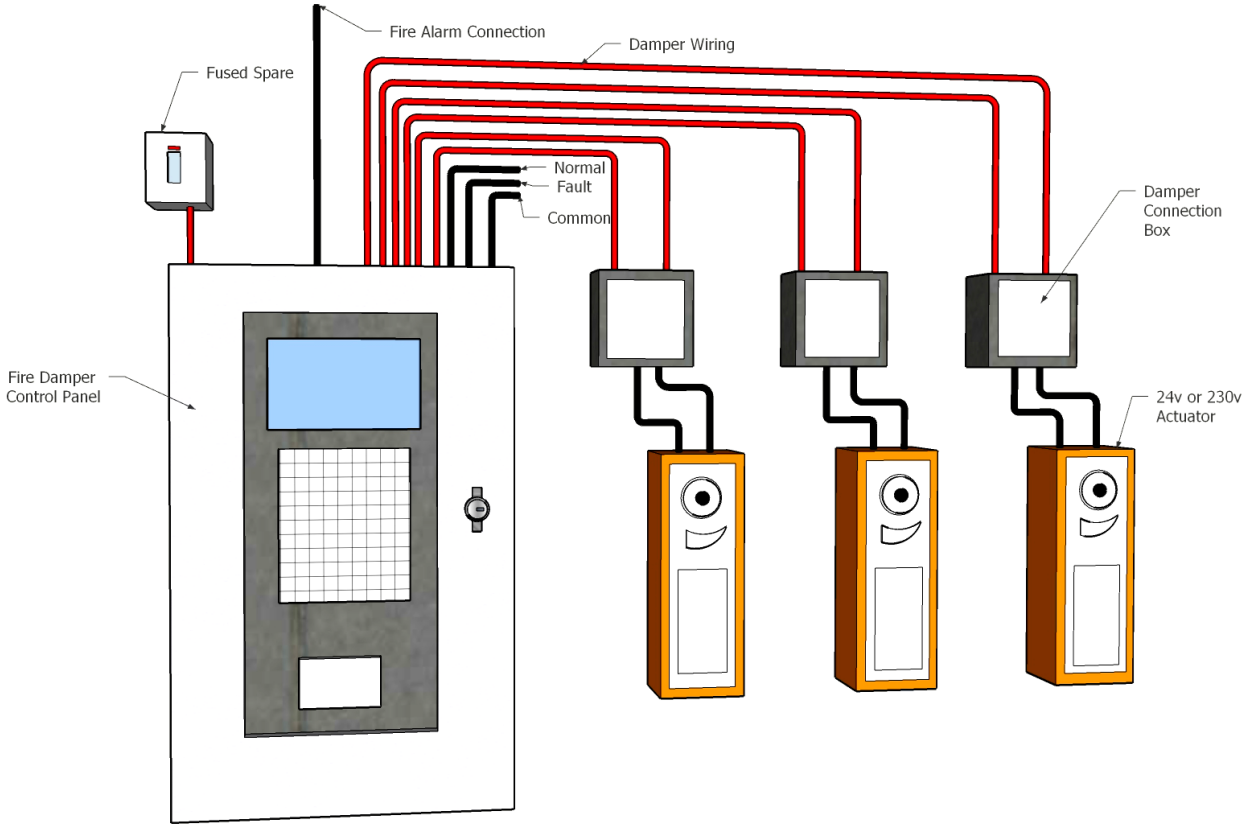
Key to **Fig No. 12**

| | |
|---|---|
| **GENERAL— ON WALL SURFACE** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture (lining out), type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of the aperture (lining out) board |
| 10 | Damper fixing details including the screw types, any drop rods supports and positions. |
| 11 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 12 | Type of construction that the wall is attached to and its classification information |
| 13 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

# 4 MOTORISED SYSTEM CONFIGURATION

## 4.1 MOTORISED FIRE DAMPER ELECTRO- MECHANICAL SYSTEM INSTALLATION CONFIGURATION 24V OR 230V

**Fig No. 13—MFD (1)**

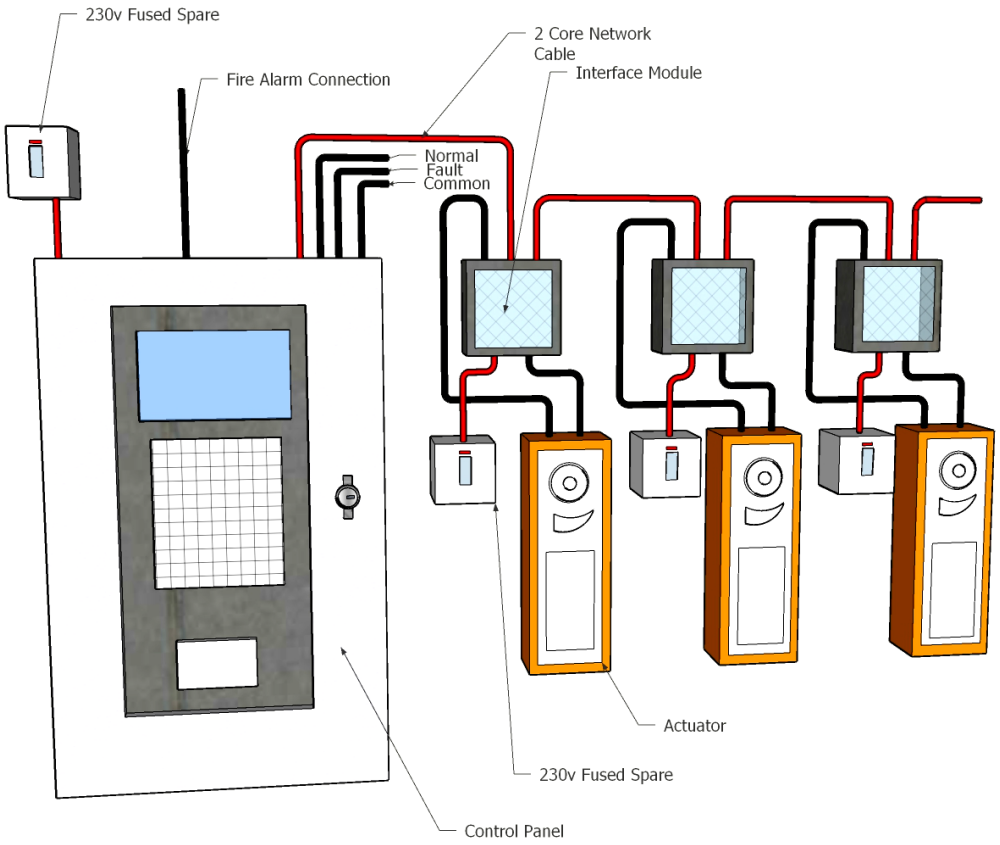



Each fire damper is individually wired back to the panel (power and comms)

- Fire alarm zones inputs are for fixed cause and effect (all close)
- Follow LUD + EMC rules to prevent any interference
- If the ''cause and effect'' schedule is not ''all close'' then check that this is not a smoke control system, where smoke control dampers should be being used.

## 4.2 MOTORISED FIRE DAMPER ADDRESSABLE CONTROL POINT SYSTEM INSTALLATION CONFIGURATION 230V

**Fig No. 14—MFD (2)**




Addressable systems control fire dampers via interface modules wired on a daisy chain network. One module is required per damper. Each fire damper also needs a local power supply.

- Fire alarm zones inputs are for a fully programable ''cause and effect'' (all close)
- Follow LUD + EMC rules to prevent any interference
- If the ''cause and effect'' schedule is not ''all close'' then check that this is not a smoke control system, where smoke control dampers should be being used.

## 4.3 INSTALLATION OF MOTORISED FIRE DAMPERS - ADDITIONAL MUST DO'S

As an installer when you are working with motorised fire dampers and smoke control dampers you must also ensure the following upon completion:

### 4.3.1 FIRE DAMPERS

- Ensure the thermal fuse is connected to the ductwork as per the damper manufacturers' instructions.
- Ensure whenever installing an actuator that it is fitted and secured correctly as per the damper manufacturers' instructions.
- Ensure the test button on the thermal fuse is activated to confirm damper operation. Please refer to damper manufactures' instructions and actuator manufacturers datasheet for details on operation of the thermal fuse.
- Ensure that all power and signal sources are installed correctly and operational as part of the installation validation.

**Fig No. 15 & 16 (L-R) — Actuator Example**




**Fig No. 17 — Actuator Example Cont.**

# 5 INSTALLATION OF FIRE DAMPERS —EXTRA CONSIDERATIONS

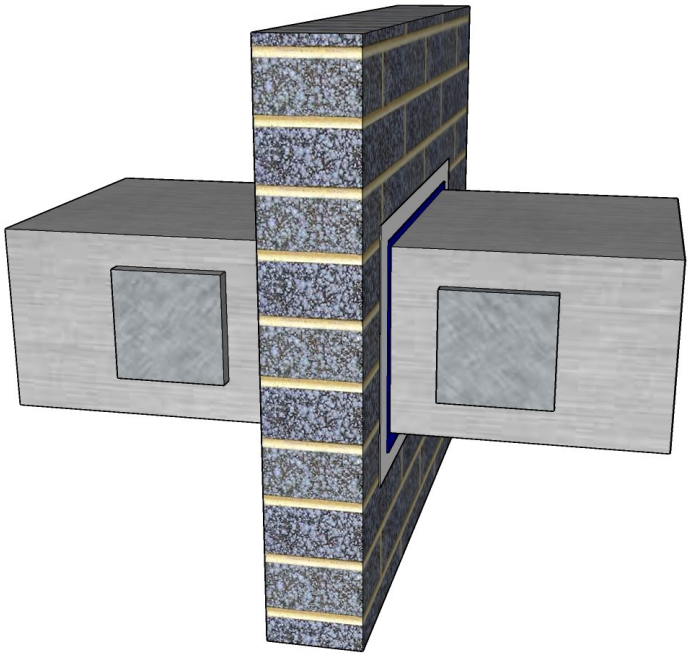
There are several things as a fire damper installer that you are required to consider when completing your duties.

**Approved Document B Vol 2 10.18**

**10.18 - Access to the fire damper and its actuating mechanism should be provided for inspection, testing and maintenance.**

Fire dampers are required to have access either side for cleaning and maintenance as shown in the diagram below:

**Fig No. 18— FD Access Demo**



**Approved Document B Vol 2 10.22**

**10.22 - Where the use of the building involves a sleeping risk, fire dampers or smoke [control] dampers should be actuated by both of the following:**

a. **Smoke detector-controlled automatic release mechanisms.**

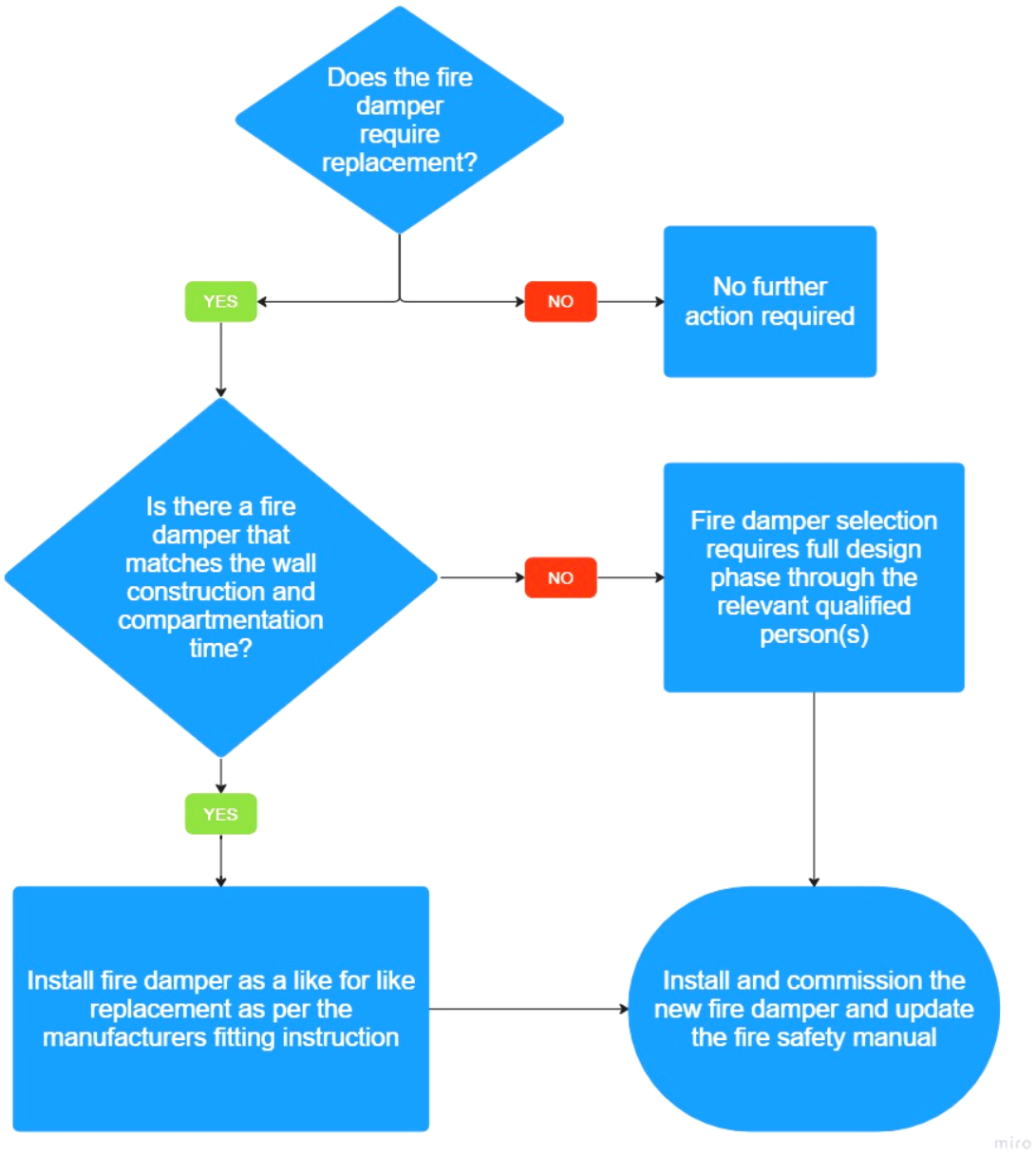
b. **Thermally actuated devices.**

**Ensure that all power and signal sources are installed correctly and operational as part of the installation validation for motorised fire dampers.**

# 6 FIRE DAMPER REPLACEMENT

While completing fire damper testing and maintenance, failures can be identified. The replacement of these fire dampers is crucial in maintaining compartmentation in a fire. It is imperative that the process is followed to meet the compartmentation strategy for the building.

**Fig No. 19— Fire Damper Replacement Process Map**




**The fire damper must meet the wall construction and compartment time. If there is no adequate replacement then a compartment redesign is required. See NAAD22 Part 3 Design for and Selection of Fire Dampers.**

# 7 EXAMPLE OF A FIRE DAMPER INSTALLATION VERIFICATION DOCUMENT

**NAADUK HAS SOFTWARE FOR THE INSPECTION OF FIRE DAMPERS FREELY AVAILABLE. CONTACT NAADUK FOR MORE INFORMATION.**

**Fig No. 20— Example Verification Document**

**Project Name:**..... **Assigned Asset Number:**.....

Inspection and handover check sheet produced on Date: XXXX

This check sheet only applies to the XXXX Model XXXX Fire and Fire/Smoke dampers. The installer should complete this handover check sheet to ensure installation is in accordance with XXXX installation guides and is compliant before handover.

| | | | |
|---|---|---|---|
| Is the dampers the correct type? | | Is the correct power supply wired to the actuator and power is on? (if motorised) | |
| Is the dampers individually & correctly identified? | | Is the Thermal Fuse/link correctly installed | |
| Is the dampers located correctly? | | Have the damper blades been released to simulate failure of thermal release mechanism (damper 'drop test')? | |
| Is the installation method tested and approved for the type of barrier that is being protected? | | Have the dampers been checked for internal cleanliness and free from damage and debris? | |
| Is the damper installed & fixed in accordance with the manufacturers tested and approved method? | | Have the dampers blades been re-set following the drop test and the access panel replaced? | |
| Have access doors been fitted to the ductwork allowing the damper blades to be inspected? | | At the time of the damper handover, is the fire damper installation completed in accordance with the above check list? | |
| Is access through the ductwork, to the damper unobstructed? | | Is the damper installation completed and available for handover prior to system commissioning? | |
| Is the penet not used for | | | |
| Using the ac damper bee | | | |
| Photographic Evidence | | Photographic Evidence | |
| Photographic Evidence | | Photographic Evidence | |



Manufacturers Product model(s): .....

Damper Reference I.D: ..... Installation location: .....

I the undersigned confirm that the damper referenced above has been checked and is installed to the manufacturers tested installation method.

Company Name: Installers Name:

Installers Telephone Number: ..... E-mail: .....

Installers signature: ..... Print Name: .....

# 8 EXAMPLES OF INCORRECT INSTALLATION

While completing installation works on fire dampers, you must know and understand what is required in the installation and what a good installation should look like. Below are examples of incorrect installation. Incorrect installations are still required to adhere to **BS:9999 Annex W.1** "Repaired or replaced immediately if found to be faulty."

**Table No.1 — Installation Standards**

| DESCRIPTION | INCORRECT INSTALLATION PHOTOGRAPH |
|---|---|
| Fire damper not installed with breakaway joints as instructed in BS:9999 and the manufacturers IOMs. Self drilling screws have been used. |  |
| Fire damper not correctly installed as per manufacturers IOMs. The hole in the cavity wall was too large for the installed fire damper. No backfill. Compartment is consequently breached. |   |
| Fire dampers not correctly installed as per the manufacturers fitting instruction and the plate has been cut to accommodate this. |  |
| Fire damper not correctly installed as per manufacturers IOMs. The hole in the cavity wall was too large for the installed fire damper. Compartment is consequently breached. |  |

**All fire damper installations are critical to the building compartment strategy, they are a LIFE SAFETY SYSTEM and should be treated as such.**

# 9 FIRE DAMPER COMMISSIONING

A person commissioning fire dampers has more responsibility than a normal testing and inspection technician. On top of this there is a requirement to have a deeper understanding of the fire compartmentation that is required to be considered when completing their duties.

**BS:9999 Section 39.1**

**"Before accepting a building for occupation, the safety of the staff and public (as well as that of construction personnel if the building is being completed in phases) should be assured by ensuring that all safety systems are properly installed and operational.**

**The design and construction of the building and the systems installed in it should be recorded in the fire safety manual (see Clause 9 and Annex H).**

**On completion of the fire safety system, the complete installation should be checked for conformity to the approved drawings and system design. Instructions on its use, planned maintenance and testing should be supplied to the owner of the premises and included in the fire safety manual (see Clause 9 and Annex H).**

**All fire safety systems should be individually tested to establish whether the final installation conforms to the agreed design specification, is functioning correctly and is ready for acceptance testing. It should be documented in writing that the installation of each system component is complete and the component is functional. The fire safety systems should then be tested as a whole to ensure that they are fully integrated and that the final integrated system conforms to the agreed design specification and is functioning correctly."**

Fire damper commissioning might not only be on a new building, we must also consider commissioning on fire damper replacements as well as building refurbishments.

**All new installations require commissioning to show that they meet with BS:9999**

This does mean the role of the person commissioning the system is important, as this is the key point in the fire damper life cycle and the technician is responsible for the following:

- Acknowledge the Allocation of Unique Asset Number
- Correct Access Requirements
- Confirmation of Installation Methods
- Confirmation of satisfactory installation
- Cleanliness Certificates (must be part of commissioning packs)
- Commissioning Test Documentation
- Identification of Defects

All information must always be collated and issued to the responsible person upon completion.

Access is always crucial for the ability to test fire dampers and on new installations fire dampers are required to have access either side for cleaning and maintenance.

# 10 THE FUNCTIONAL INSPECTION

**Table No.2 — Functional Inspection Checklist**

| FUNCTIONAL INSPECTION CHECKLIST | |
|---|---|
| **Is the integrity of the fire compartment intact**? | Can any breaches in the compartment be identified that will compromise the compartment system? |
| **Is the damper installed as per the Installation and Operation Manual or fitted as per the approved deviation method?** | Confirm based off the Installation Verification Certificate or DW145 Certificate for the fire damper and the design installation method. |
| **Access Doors Installed** | Are there access doors on either side of the fire damper? If not, has the system been cleaned after install as it is a requirement. |
| **Check for obstructions?** | Is there anything running through the fire damper, are there high levels of contamination? |
| **Is the orientation correct**? | For airflow and for testing? |
| **Is there transit tape present?** | This is not a failure but remove, document its presence and test |
| **Perform and document functional test** | Operate mechanically or electrically as damper requires |
| **Are the springs damaged or twisted?** | This will be visible in the channels |
| **Is the fusible link in a good serviceable condition?** | Again, check and inspect. Replace if necessary |
| **Is the system visibly contaminated?** | Is the system contamination level visually contaminated and will it affect operation in the event of a fire? |
| **Are all the connections for MFDs fitted correctly?** | Check all connections are secured and signed off to the correct method within the IOM and system requirements. |

## 10.1 FUNCTIONAL TEST

- Ensure the fire damper has access on both sides
- Clean the fire damper of all debris and contaminants
- Take photographs to show pre-test fire damper position
- Take photographs of the penetration seal
- Activate the fire damper how it should operate either by removing the fusible link or operating from the MFD control source
- Take photographs of the fire damper in the closed position
- Reset damper and take a photograph in the reset position
- Take photographs of the inside of the adjacent ductwork
- Close the access door to the fire damper

# 11 WHAT A COMMISSIONING REPORT MUST OUTLINE

**Table No.3 — Commissioning Report**

| COMMISIONING REPORT CHECKLIST | |
|---|---|
| **Assigned Unique Reference Number** | This must be specific to the site and current best practice utilises 2D or standard barcoding that creates the start of a damper history portfolio. |
| **Location** | A clear location identification as shown on the relevant schematic drawing so asset can be located. |
| **Type** | This is the make and model of the fire damper. |
| **System Type** | Supply, extract or air transfer |
| **Installation Method** | Is this tested and approved, does the damper match the wall construction? |
| **Functional Inspection Checklist** | Review and include in the report. |
| **Photographic Evidence** | Must be taken showing pre-test, post-test, reset of damper, failures etc. This is a current date stamped photograph. Some clients will not allow photography due to personal protection, official secrets act etc. On these examples an exception instruction should be given by the site responsible person. A photograph of the penetration seal is required. |
| **Size** | The size of the fire damper is critical for accurately conducting remedial works. |
| **Cleanliness** | As per the pre-commissioning requirement has the system been cleaned? Is there evidence? |
| **Identified Defects Action** | All defects must be recorded, and proof of rectification issued as part of the commissioning pack. |
| **Fire Barrier Integrity** | There should be one continuous seal between all elements. |

**ALL IDENTIFIED DEFECTS MUST BE RECTIFIED PRIOR TO COMMISSIONING CERTIFICATES BEING ISSUED AS FIRE DAMPERS ARE A LIFE SAFETY SYSTEM.**

**All reports must be kept as part of the building operating manuals or operation and maintenance manuals (Building Regulation 38). This is a critical part of the Golden Thread.**

# 12 WHAT A COMMISSIONING PACK MUST CONTAIN

## For Each Damper

- **Fire Damper Installation Validation Certificate—**This should be completed by the installer and validated by the commissioning technician
- **Fire Damper Installation Details—** This must be for the make and model of the fire damper and the specific installation method used
- **Additional Design Information—**Any additional design information and specific installation details

## For The Whole System

- **Asset Register**— This must be a complete fire damper register showing all assets
- **Site Specific Schematic Drawing—** A clear concise schematic of fire damper locations
- **Each Dampers Individual Pack—**As detailed above
- **Control Systems—**Common system details, working diagrams, cause and effect schedule (where fitted)
- **Commissioning Report—** Highlighting all identified issues

**All commissioning documents form part of the buildings fire safety manual.**

**This report must be in a format that can be included within the *Golden Thread.***

# 13 TRANSFER OF RESPONSIBILITY

Upon completion of the fire damper commissioning, it is necessary to hand the documentation over to the responsible person(s) or fire management team of a project.

**Regulation 38 (Building Regulations of England and Wales)**

**2. The person carrying out the work shall give fire safety information to the responsible person not later than the date of completion of the work, or the date of occupation of the building or extension, whichever is the earlier.**

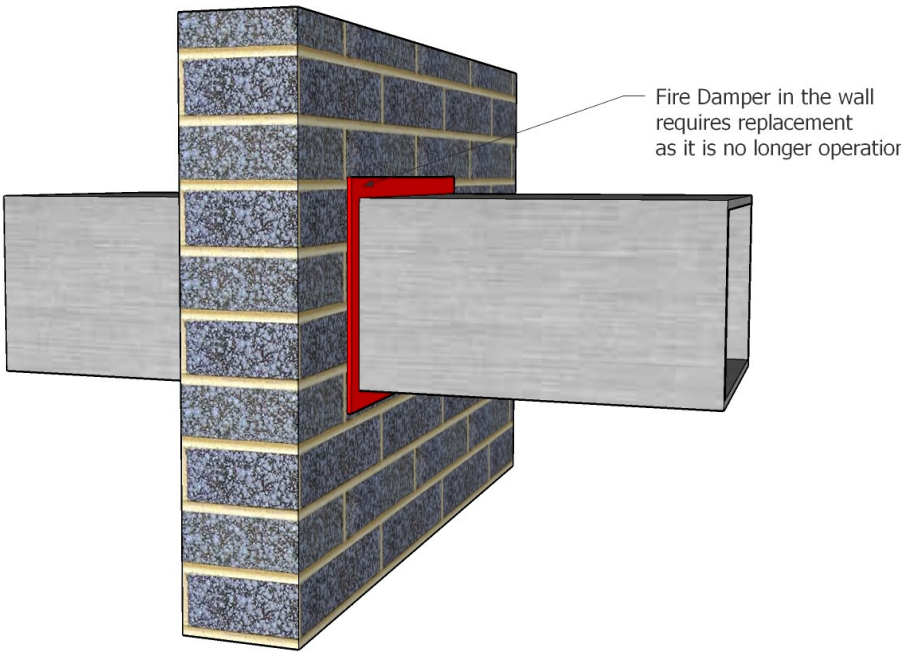
The transfer of responsibility with clear and concise information, the manufacturers recommended testing regime as well as the environmental considerations for the inspection and maintenance frequency.

**Fire damper commissioning is key in quality assurance and should be completed to determine and find issues prior to a building going live.**

# 14 POSSIBLE SCENARIO FOR FIRE DAMPER REPAIRS

1. Ensure risk assessments and method statements (RAMS) in place
2. Check sizes on survey—DUCT SIZE AND DAMPER SIZE
3. Decide on which method to suit application of repair
4. Ensure all parts are acquired before work commences
5. Check the ventilation performance prior to any works

**Fig No. 21— Fire Damper unit requires replacement**



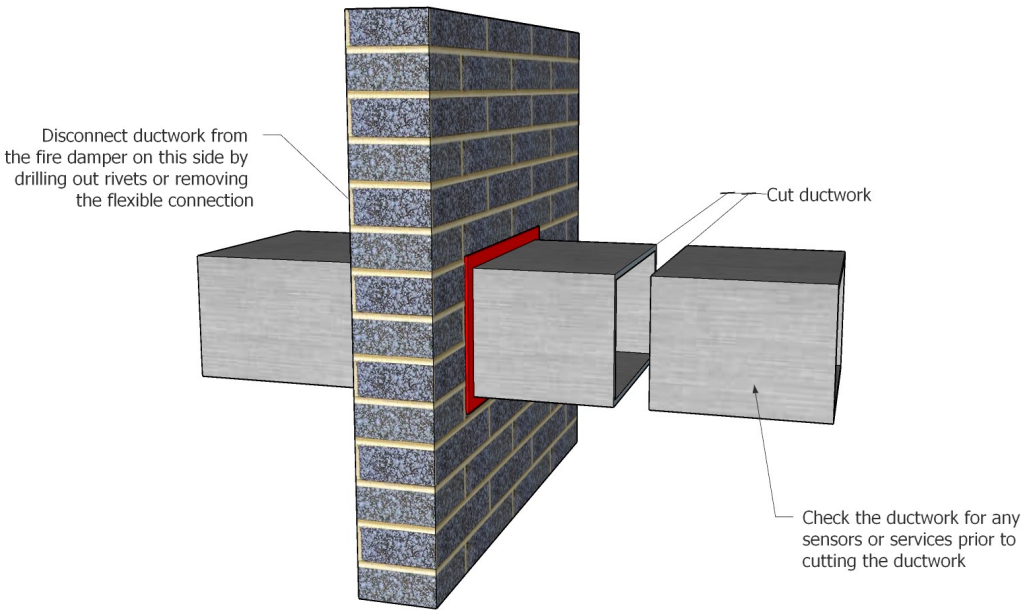




**Fig No. 22— Make safe area to work on fire damper removal**

**Fig No. 23— Remove fire damper**

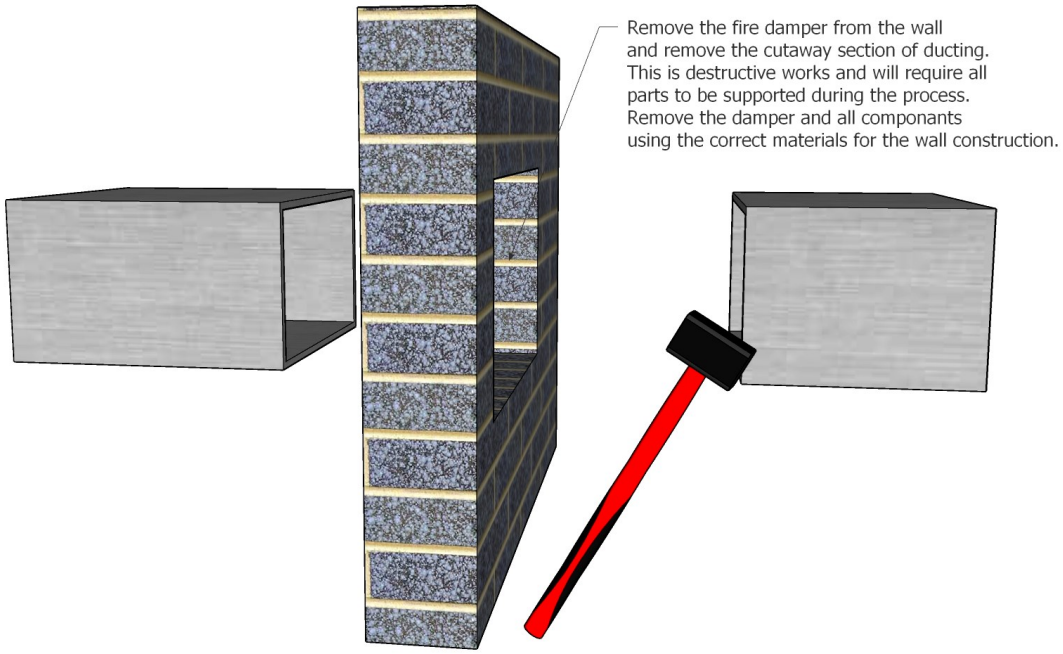



**Fig No. 24— Fire Damper Re-installation**

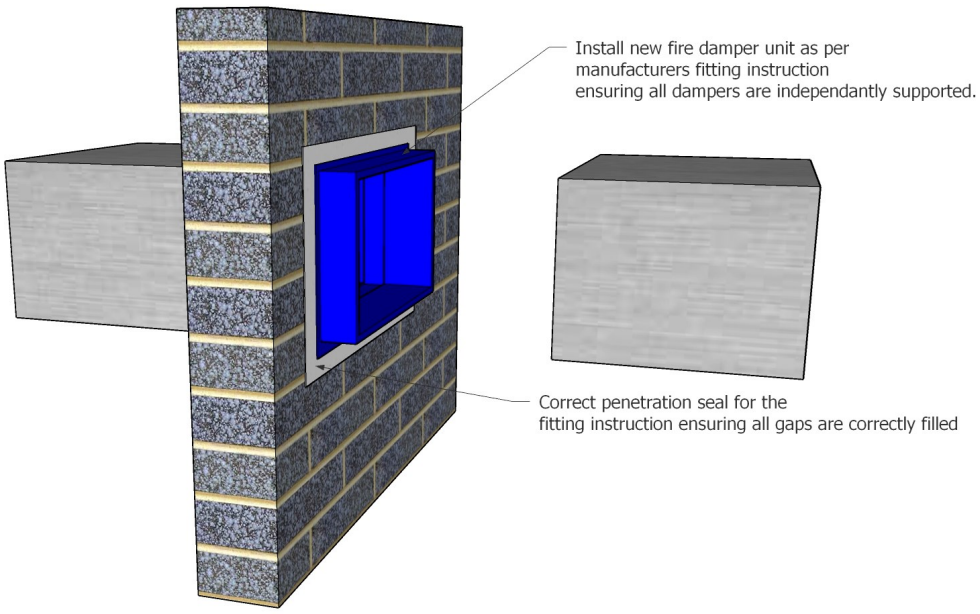


**Fig No. 25— Fire Damper Re-installation solid ductwork**

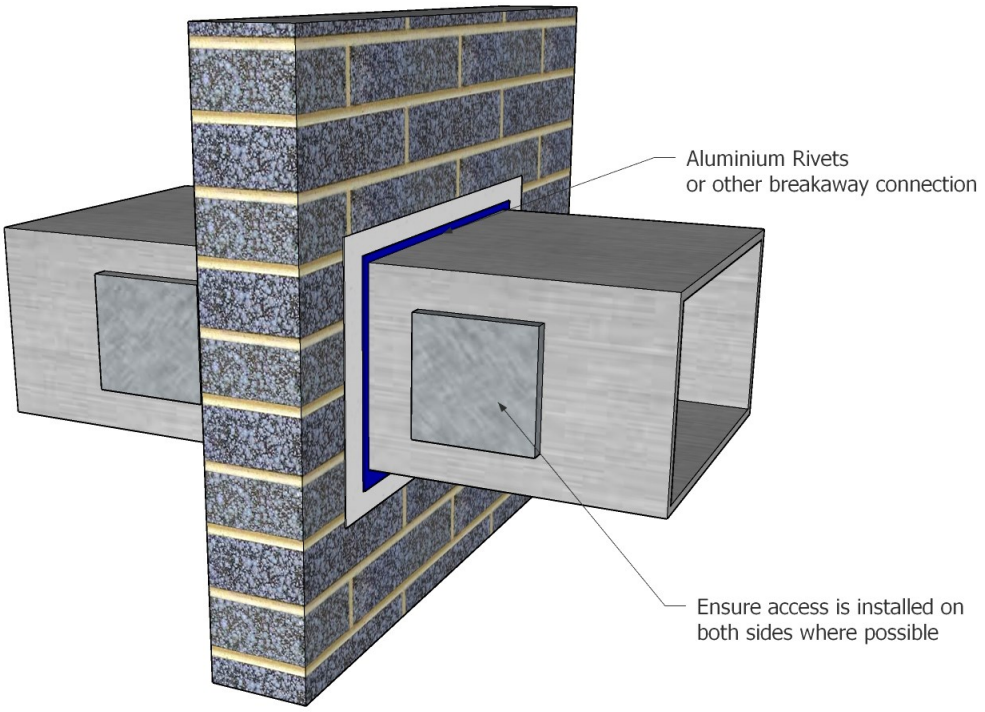



**Fig No. 26— Fire Damper Re-installation Flexible connection**

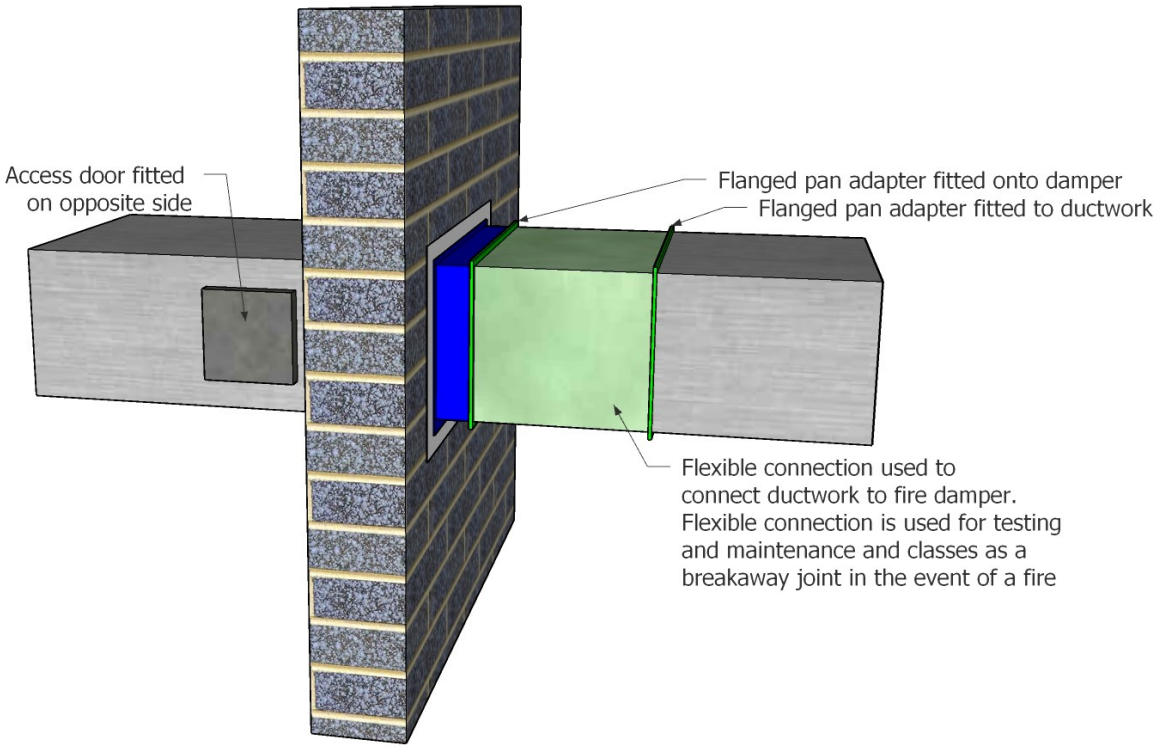


**Fig No. 27— Fire Damper access retractable ductwork**

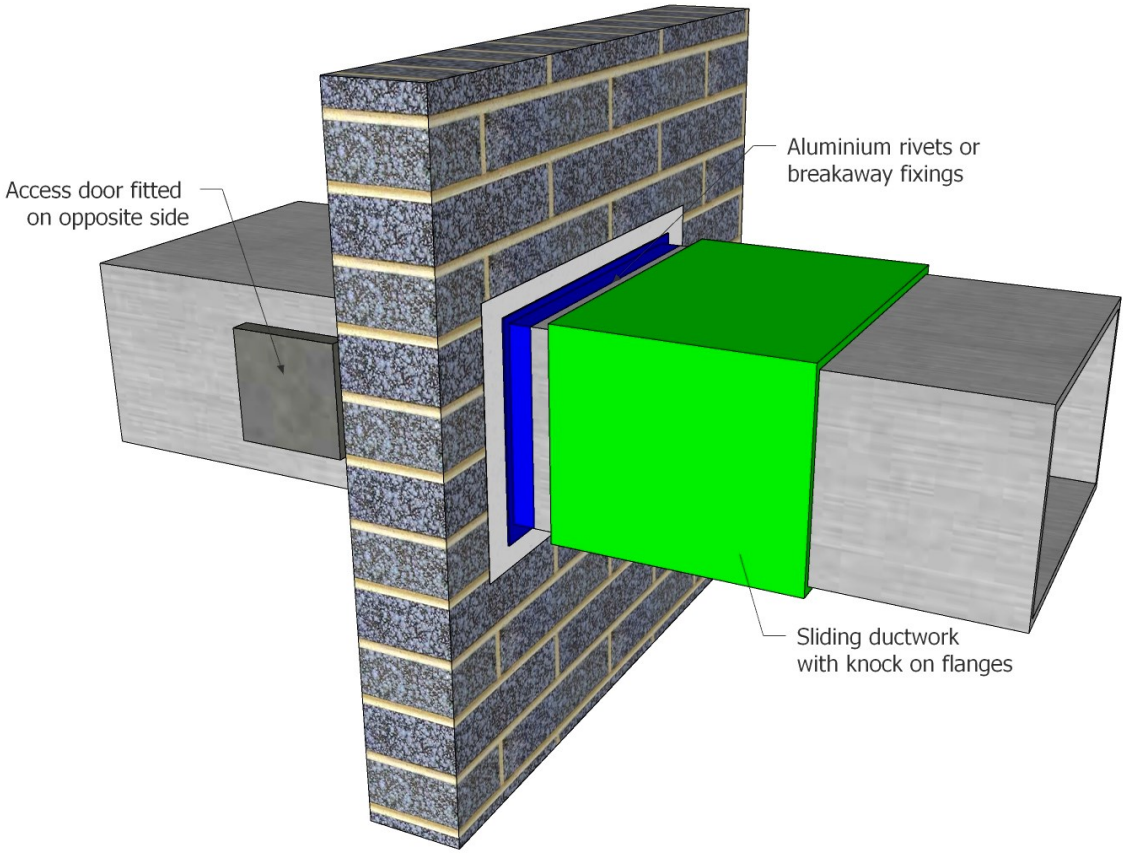



**Fig No. 28— Self drilling screw (tek screw)**

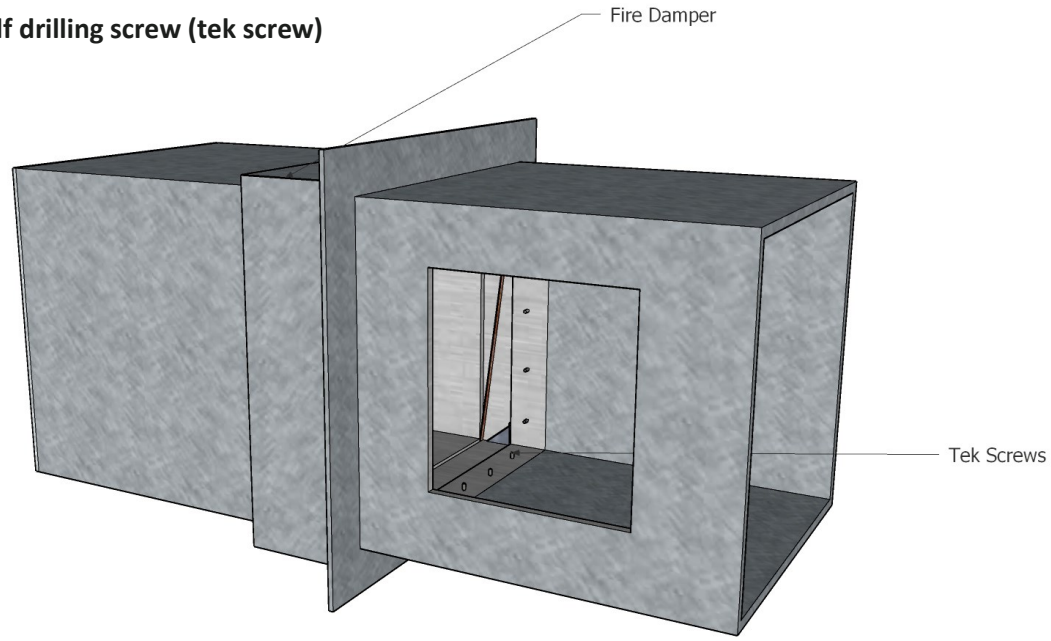


**Fig No. 29— Tek Screw removal**

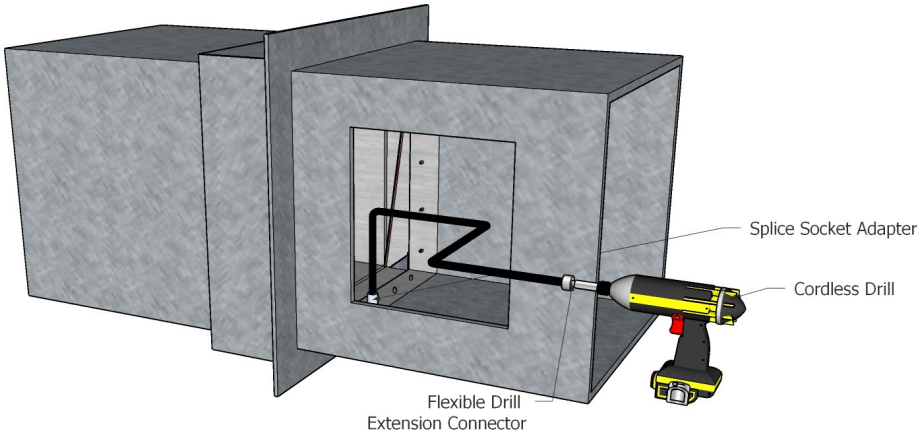
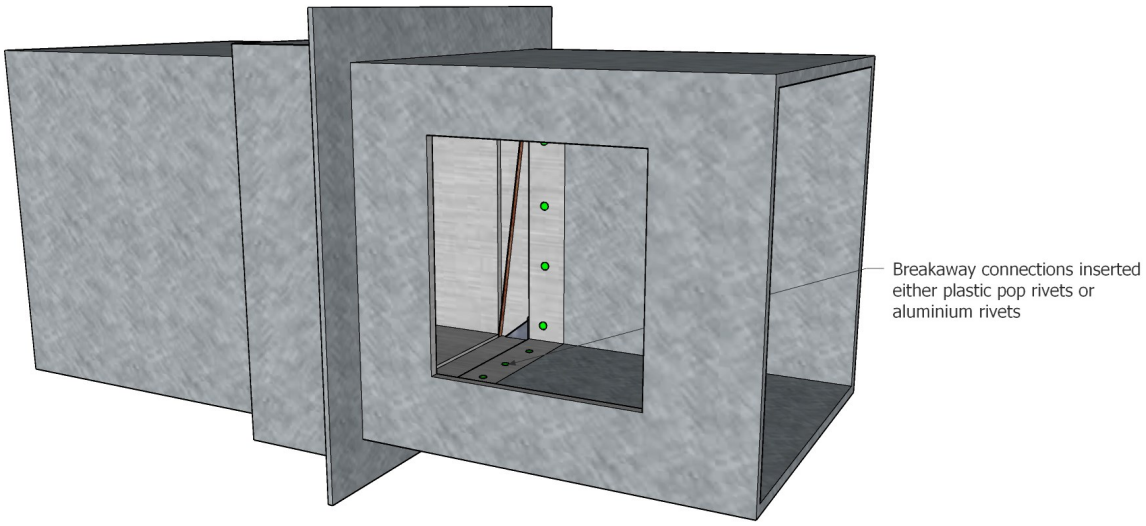



**Fig No. 30— Tek Screw removal**




**NOTE:**

Fixing to wall:

1. Manufacturing Instructions
2. Ensure correct orientation
3. Where wall or ceiling allowance can not be met – **DO NOT** cut face plate, fold it to maintain structural strength and keep tried and tested features
4. Use only approved fire sealants
5. If installing flexibles as breakaway ensure duct is supported as flex is not a rigid structure. Ensure flexibles are taut to maintain airflow.
6. Flex can be used as access to comply with **RRFSO2005/HS1992 L24 (Rev 2013)**

# 15 OTHER SPECIALISED DAMPERS

## 15.1 FIRE DAMPERS FOR WASTE CHUTES

Waste chute fire dampers are usually an application specific bespoke product.

A fire damper should be the minimum provided at the chute exit before the bin to prevent fire training up the chute. The chute itself should be inspected and cleaned if necessary, to prevent build up debris within the chute. It would generally be expected that waste chute fire dampers would be inspected as frequently as standard fire dampers, depending upon the level of soiling that's found.

The damper should be inspected and tested, so that its operating mechanism can be checked i.e. Fusible links etc. Here are a few examples:-

**BS 1703:2005 Refuse chutes and hoppers specification** standard gives a good guidance on a typical layouts of chute in construction. All chutes should have a chute cut off.

**Fig No. 31 & 32 (L-R)**

**— Refuse Shoot (1)**

**Fig No. 33**

**— Refuse Shoot (2)**

**Fig No. 34 & 35 (L-R)**

**— Refuse Shoot (3)**

## 15.2 MARITIME

Marine A60 fire dampers are passive fire protection products used in the marine industry to prevent the spread of fire through fire-resisting bulkheads and decks, from any fire-rated space. Marine fire dampers must be Marine Equipment Directive 2014/90/EU certified for A60 fire performance. These fire dampers should also be Lloyds approved.

Fire dampers in this environment generally allow a minimum of 60 minutes safety time to allow the crew to either extinguish, evacuate or await the arrival of the rescue vessel to arrive.

**Fig No. 36, 37 & 38 (L-R) — Marine A60 FDs**

It should also be noted that submersible vessels might also be required to protect compartments from the affects of flooding in the case of emergency. Fire dampers need to protect against cellulosic fire as well as potential hydrocarbon fires in this environment.

The installation of these fire dampers must strictly adhere to the manufacturers instructions.

A thorough read through of relevant standards is recommended before proceeding with any works on these devices. These standards are below:

- Marine Equipment Directive MED96/98/EU
- Lloyds Register IMO Annex 1 pt 3 Class A1, A15-A30 and A60
- Solas Certificate SAS A80117/M1
- USCG Certificate MED 1850080/M1
- EC MED 1850080/M
- EC Conformity MED 1850123
- Certificate of Fire Approval SAS 180117/M

**Fig No. 39 — Maritime Freighter**

## 15.3 NUCLEAR INDUSTRY

The Office for Nuclear Regulation (ONR) is the primary regulator for nuclear safety and security in the U.K, and are responsible for setting and enforcing safety standards and regulations within the U.K. nuclear industry. The ONR work with the Health and Safety Executive (HSE) to ensure compliance to safety regulations, including fire safety.

Fig No. 40 —Nuclear Power Station

There are several other requirements that fire dampers must conform to within the nuclear industry.

Fire dampers that are installed in the radioactive areas are to be of a non-corrosive base i.e. ceramic or stainless steel to minimise the effect on these dampers.

To comply with BS EN 15650 fire dampers shall be fire resisting and shall be type tested to comply with the test method detailed in BS EN 1366-2. The type tests shall be carried out in both the horizontal and vertical orientations.

Each damper shall be fitted with status switches as detailed in the Technical Information Sheets, item 24, to provide remote indication of damper open and close status. In addition, local indicationof the damper open and close status shall be provided by means of a high visibility beacon or pointer

Fire dampers in radiological controlled facilities are typically installed adjacent to a wall or floor by fixing the fire damper to a fire resisting sleeve or fire resisting installation frame, which is built into the fire boundary. In all other aspects the same guidance on **BS9999:2017** applies.

Fire dampers in the U.K. nuclear industry are required to follow the conventional standards, such as BS EN 15650, BS EN 13501, BS 9999, and BS EN 1366, but there are also U.K. nuclear industry best practice standards which are advised to be followed due to the role fire dampers have in ensuring nuclear safety.

The standards to be followed are:

- ONR Technical Assessment Guide NS-TAST-GD-022
- International Atomic Energy Agency (IAEA) Safety Guide NS-G-1.7
- Sellafield Ltd Engineering Guides 1715, 1720, 1721, and 1738.

Fire dampers within the third generation pressurised water reactor "EPR" design may follow French standards like NFS 61 937. Additionally, the Nuclear Institute National Nuclear Ventilation Forum seek to make efficiencies across the industry by contributing to shared procurement specifications and design guides

In conventional industries, fire dampers are important for life safety and asset protection, however in the nuclear industry fire dampers form part of the "nuclear safety case", which seeks to ensure that all reasonably practicable steps have been taken to prevent and mitigate nuclear or radiation accidents. A fire must not cause the loss of more than one set of redundant equipment in an **F1 system** (an F1 system is to either attain a controlled shutdown state or to secure safe shutdown after the controlled state has been reached). Additionally, spurious failure/activation of fire dampers in nuclear safety significant ventilation, which provides cooling air to F1 systems, must be reduced to prevent the unavailability of the F1 system. Therefore, the manufacturing quality and fire damper robustness of nuclear safety significant fire dampers must be to the highest practicable standard.

This leads to nuclear safety significant fire dampers typically being "high integrity" fire dampers; manufactured from stainless steel (304L or 316L), irradiation resistant, tested for operation in seismic events, and sometimes including intumescent seals between the damper blades for enhanced fire barrier performance.

Within nuclear industry installations, fire dampers are often connected by a fire detection system to ensure their closure and compartmentation in a fire event (noting that the fire dampers have thermal trigger mechanisms, sometimes twin frangible bulb arrangements).

We recommend the full guidance from the ONR before commencing any work on these type of sites.

**Note:** This is a specialised industry that has its own set of regulations and requirements that match their specific needs.

## 15.4 HIGH TEMPERATURE RISK

Fig No. 41—High Temperature Rated FD

High temperature rated fire dampers need to be tested against hydrocarbon fires. The main difference compared to a cellulosic fire is the rapid rise of heat. After only a few minutes a hydrocarbon fire can reach temperatures of over 1000°C. Because of the immediate high temperatures these fire dampers require special construction to cope with the extensive heat and gases that the fire generates. These fire dampers are always required to maintain the integrity of the compartment for 120 minutes. In most cases an insulated rating is required in this application and manufacturers test standards should be looked at for the application to meet the compartment protection requirements.

**Note:** These are specialised industry fire dampers that have their own regulations and requirements to suit the specific needs of each particular industry.

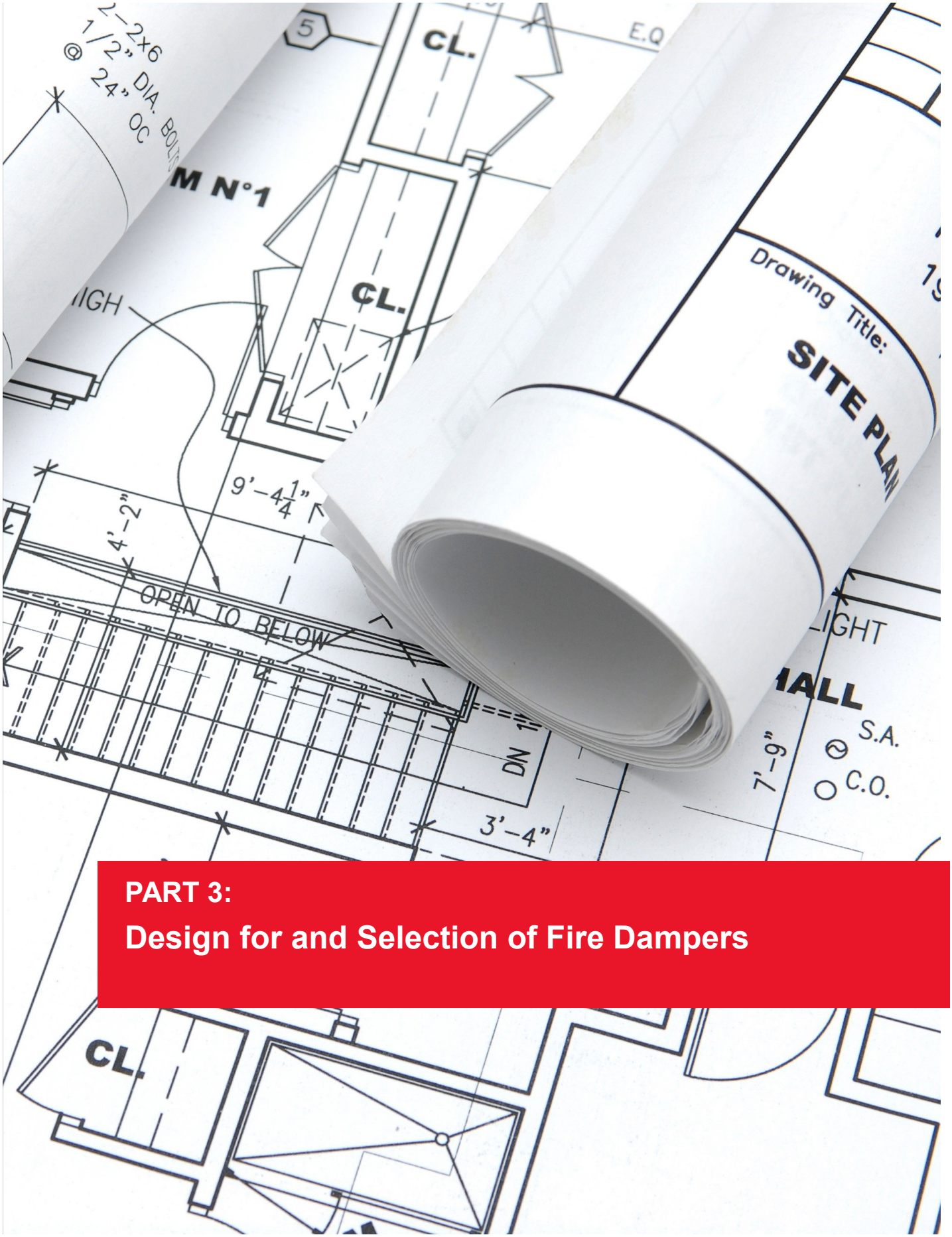
Fig No. 42—ATEX FD

## 15.5 ATEX/EX FIRE DAMPERS

ATEX fire dampers are designed to operate in explosive environments . These fire dampers are designed to protect and operate in specific zones in an explosive environment. Specialist ATEX ratings are supplied with each fire damper and should only be used in the specified field of application.

For further information please see *ATEX Certification Product Guidelines.*

**Note:** These are specialised industry fire dampers that have their own regulations and requirements to suit the specific needs of each particular industry.




PART 3

# PART 3:
# Design for and Selection of Fire Dampers

# PART 3 — DESIGN FOR AND SELECTION OF

# i OVERVIEW

NAADUK would like to introduce this section, Design for & Selection of Fire Dampers, with the comments made by a contributor, at one of **NAADUK's** meetings held to produce this guide. We feel this should be read and absorbed fully at the beginning of this section, as it demonstrates the main failure of the industry.

"*The problem with fire dampers is the procurement process.*"

The two most important documents at the start of the fire damper selection process are the *Fire Strategy* and the *Management Strategy*. The two documents should be completely aligned for building risk type, space risk type, how active fire is managed, and people evacuated in a fire scenario.

*"It is very rare that you will see the management strategy of a building until the week before hand over or post completion and even then, there are commonly arguments between clients and contractors last minute on whom should be producing it."*

When we consider that an architect coordinates the designs of others, a fire engineer is not a product expert and the services consultants are not experts in product classifications, there is a tendency to push fire dampers to a Contractors Design Portion (CDP). The push from the tier one contractors is to then ask the fire damper manufacturers to fill the gap in lack of descriptive design.

*"A fire damper manufacturer is not an expert on the risk category of buildings and their internal spaces. By no means are they mind readers on the substrate to be used to house them and the access to the space to form the fire seal at the work face, though somehow when the curtain drops, it's all their fault."*

The simplest way to resolve a procurement process that is premised on a race to the bottom is to understand the race is not always about cost, but also about education in relation to whom is perceived to hold the expert knowledge in the selection of the product, the interface of the product and maintenance of the product.

*"Within construction it is common that fire dampers are referred to as FDs, MSFDs, MFDs, MFSDs etc. A manufacturer is expected to relate these 2 to 4 letters to a process, that when enacted properly involves regulatory prescribed hazards that are reserved for those whose competency is assured.*

*''Until the person or persons that are responsible for ensuring that the fire strategies are aligned with the Management Strategy have provided the correct classification information, based on the information for all risk areas of the building it is not possible to specify the fire dampers.*

*This information will allow the descriptive selection to be written by the Building Services Consultant."*

This will allow a manufacturer to select products correctly, otherwise unsound selections made at the latest possible time may prevail.

**NAADUK** are determined that this section coupled with other modules, could lead to a professional university degree.

# 1 INTRODUCTION TO THE DESIGN FOR & SELECTION OF FIRE DAMPERS

## 1.1 GENERAL

This information is for those who design for and select *fire damper devices* (FDs) to maintain compartmentation where ventilation systems (ductwork) pass through compartment boundaries. The person performing this work should understand that fire dampers and *smoke control dampers* (SCDs) are two different devices.

The person designing and selecting for FDs must understand:

1. the principles of compartmentation
2. the standards and principles for testing FDs and SCDs
3. the applications of FDs and SCDs
4. the correct procedures for the selection and installation of FDs
5. building services spatial coordination
6. the correct procedures for access to, regular testing, maintenance etc for FDs.
7. demonstrate good behavioural and ethical competence

It would be expected that the person undertaking this function would be at NVQ Level 5 (England) or above.

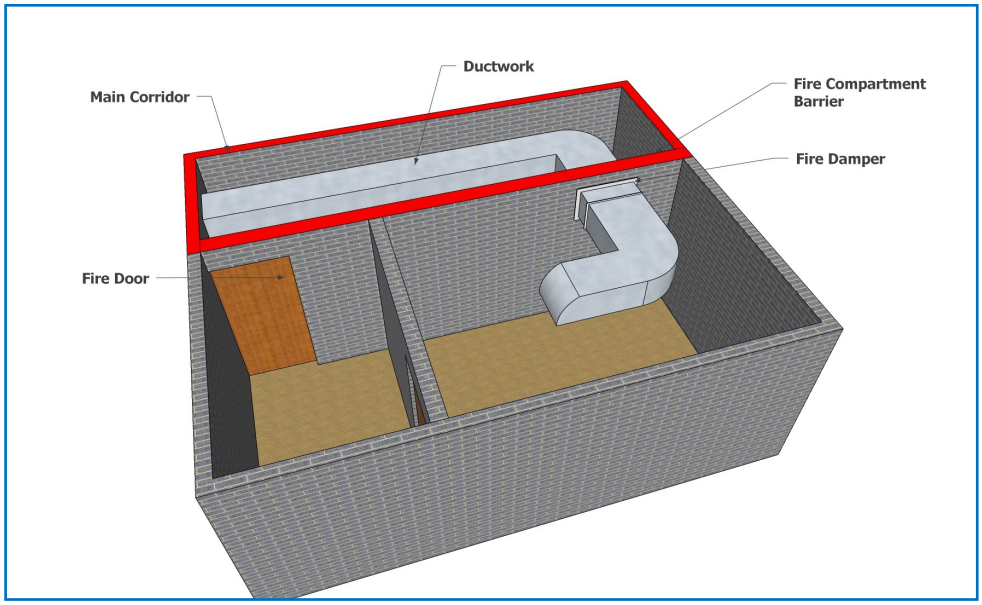
All of the required knowledge for the following may not be held by one singular party and may need a collaboration between different groups, as required and controlled by the responsible person, to ensure all aspects of **Part 3: Design for and Selection of Fire Dampers** are duly considered.

## 1.2 PRIOR LEARNING/EXPERIENCE

A person looking to design for and select fire dampers would be expected to have prior knowledge of the physical design of ventilation systems, air flow, pressure drops, fan selections and associated information.

Some knowledge of compartmentation is also required.

**Fig No. 1—Compartmentation**



# 2 PERFORMANCE CRITERIA UNDERSTANDING COMPARTMENTATION

## 2.1 DEFINITIONS

**Compartment (fire):** A building or part of a building, comprising one or more rooms, spaces or storeys, that is constructed to prevent the spread of fire to or from another part of the same building or an adjoining building.

**Compartment wall or floor:** A fire resisting wall or floor to separate one fire compartment from another.

## 2.2 GUIDANCE

All of the following should be provided as compartment walls and compartment floors and should have, as a minimum, the fire resistance given in **Approved Document B (ADB) Section 8**.

**8.2 A wall common to two or more buildings should be a compartment wall.**

**8.3 Parts of a building occupied mainly for different purposes should be separated from one another by compartment walls and/or compartment floors. Compartmentation is not needed if one of the different purposes is ancillary to the other.**

**8.4 Effective compartmentation relies on both of the following:-**

- **Fire resistance should be continuous at the join between elements forming a compartment.**
- **Any openings between two compartments should not reduce the fire resistance.**

**8.5 The lowest floor in a building does not need to be a compartment floor.**

The protection of compartmentation using fire dampers is defined in **Approved Document B (ADB), BS9991 and BS9999.**

There are two methods described where fire dampers are used (“Methods 1 and 4”) and these are selected depending on the position of the fire damper and the space that it is in.

**Method 1** – thermally activated fire dampers.
**Method 4** – automatically activated fire and smoke dampers triggered by smoke detectors.

### 2.2.1 METHOD 1 – E CLASSIFIED FIRE DAMPERS (FD)

These will be products such as curtain fire dampers or round single blade dampers which are fusible link controlled only.

E classified dampers prevent the spread of fire and some may have an S classification (reduced smoke leakage) as well, but not being motorised they cannot respond to a smoke alarm as required by Method 4.

These fire dampers only close when the temperature around the fusible element reaches 72°C.

### 2.2.2 METHOD 4 – ES CLASSIFIED FIRE DAMPERS RESPONDING TO SMOKE ALARMS (MFD)

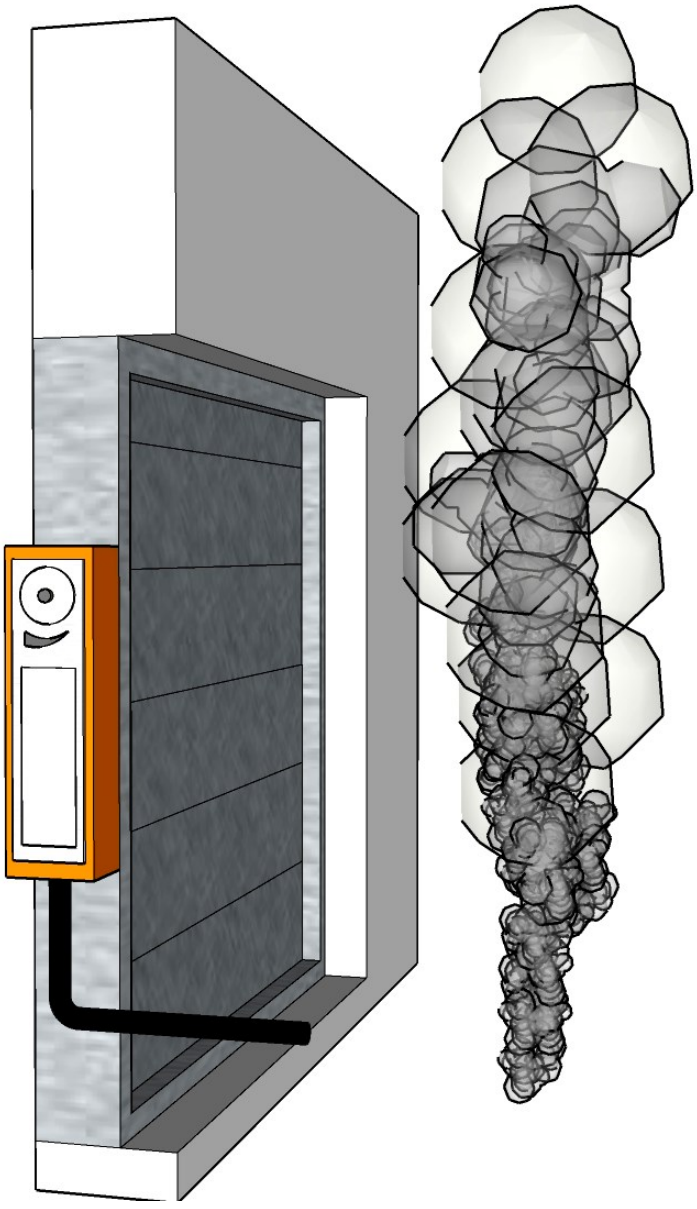
These units are motorised, and they have to be connected to a smoke alarm, usually via a fire damper control panel. They must close in response to the smoke detector going into alarm. They generally have spring return actuators that close the fire damper on loss of power. An MFD must also have a fusible link to comply with testing and provide a failsafe backup.

The fire damper has **E** and the **S Classification** because it has reduced smoke leakage. It is not for the control of smoke but is just to provide extra resistance against smoke leaving the fire compartment.

You should know that a curtain fire damper leaks significantly even when closed at lower temperatures.

Fire damper control panels do not usually have a “cause and effect” schedule because all the fire dampers should close on any alarm.

**Fig No. 2—MFD S Classification**



## 2.3 CLARIFICATION OF DAMPER TYPES

Unfortunately many publications including **Approved Document B (ADB)**, use the reference "fire and smoke damper" or "combination fire and smoke damper". This can lead to confusion. As an industry we are changing this to simplify the issue, hence the use of Motorised Fire Damper in this document for **Method 4**. There are other forms of response to a smoke alarm, each method usually requires some motive power device and must have the **S classification.**

Not covered in this document are Smoke Control Dampers (SCDs). These have an application simply for smoke control systems. They must have an actuator and are motor open/motor closed – no springs and no fusible links. They have different standards for testing and classification. They have no safety position, and their required position is only known when a fire breaks out and smoke and heat are produced.

### 2.3.1 SUMMARY OF DAMPER TYPES

**Table No.1 — Damper Types**

| TYPE | DESCRIPTION | CLASSIFICATION | OPERATION | TESTED TO |
|---|---|---|---|---|
| FD | Fire Damper | E classification | Fusible link only | Tested to EN 1366-2 |
| MFD | Motorised Fire Damper | With ES classification | Close in response to alarm<br>Fusible link | Tested to EN 1366-2 |
| SCD* | Smoke Control Damper | With ES classification | Open or close under the cause and effect in a smoke control system | Tested to EN 1366-10 |
| **-The latter SCDs are not dealt with in this document, but it is important to know the differences. They do not need the word motorised because they must be motorised.* | | | | |

## 2.4 OTHER METHODS

The other two methods are protection with enclosures and/or with fire resisting ductwork. These do not use fire dampers.

**Method 2** – fire resisting enclosures.

**Method 3** – protection using fire resisting ductwork.

These are also not covered here, but they should be understood. It is advisable to point out that trying to build an enclosure to "fit" a fire damper is not an acceptable method, because it has not been proven by a fire resistance test to maintain the compartmentation at any of the joints or connection points to either the fire damper or the compartment barrier.

# 3 HOW TO READ AND UNDERSTAND COMPARTMENTATION DRAWINGS

Compartmentation drawings should be supplied as part of the fire strategy package. There will be a key on the drawings showing the fire resistance of each floor/wall/shaft construction. How to read these drawings and check continuation of compartmentation is important and especially so for the selection of items such as fire dampers and fire resisting ducts as they are required to maintain these compartmentation values.

You may be involved in the preparation of these drawings, and you may need to get them changed to suit the fire dampers selected.

If you are involved, you need to follow the tables for compartmentation given in **Approved Document B.**

# 4 UNDERSTANDING VENTILATION

Ventilation in buildings is often achieved by using ducted systems. These systems have specialised designs and include reductions of duct size to balance pressure. There are other components such as volume control dampers that enable the balancing of systems.

Air volumes are calculated based on many parameters; e.g., personal fresh air ventilation requirements, heating loads and cooling loads.

There are many other books on ventilation, and it would be expected that the principles of ventilation are fully understood. Please refer to **NAAD21 Appendix 6** which includes all the **CIBSE Ventilation for buildings Other Than Offices** and **Appendix F in NAAD22.**

This will help in the visualisation and realisation of air flow and why ducts are laid out as they are and where the routes may be restricted where fire dampers have to be used.

One major point is air pressure drop. If a system is originally designed using FDs such as curtain fire dampers which have almost complete free area and thus low pressure drop and it is realised that these should have been selected as MFDs responding to smoke alarms then it must be understood that these add considerable pressure drop due to the blades and therefore the ventilation system, duct sizes etc may need to be changed to reflect energy consumption, see **Approved Document L (ADL).**

This change has other knock on issues with regard to cost. Ducting may need to have a larger cross section to reduce drag and pressure drop. Power supplies will be required. Each fire damper will need to be cabled to a smoke detector, probably via a central control and feedback panel. This, in turn, will have labour and skills costs.

# 5 HOW TO READ AND UNDERSTAND VENTILATION DRAWINGS

Mechanical services drawings showing duct work should be available as part of the design specification package. These are needed to confirm where the ductwork crosses compartmentation barriers.

You may be involved in the preparation of these drawings, and you may need to get them changed to suit the fire dampers selected.

# 6 APPLICATION RISKS, E.G. BUILDING TYPE, SLEEPING RISK, PROTECTION OF ESCAPE ROUTES

## 6.1 GENERAL

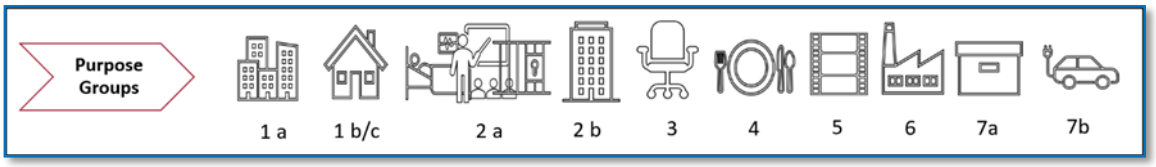
This section describes how the building and position within the building affects fire damper selection.

Before considering product selection the designer needs to know many things about the building. This will include its purpose, its size and shape, specific areas within the building and probably most significantly the compartment barrier (wall/floor/shaft) type.

## 6.2 BUILDING PURPOSE GROUPS

Determine the purpose group of a buildings and refer to **Approved Document B.**

**Table No.2 - ADB Table 0.1**



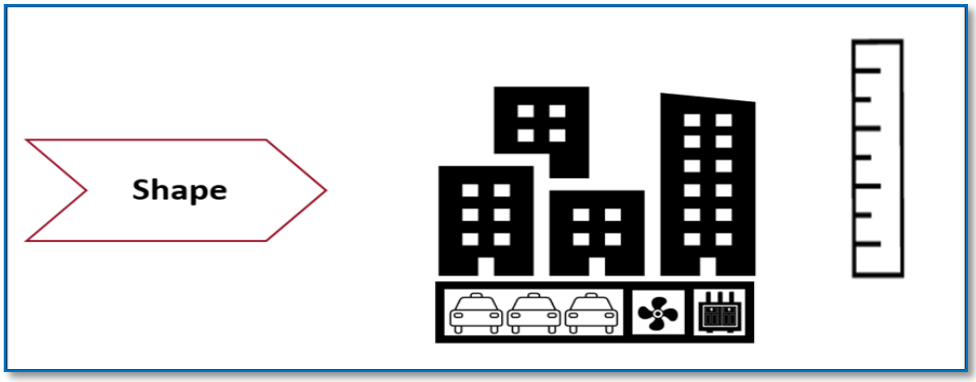

| 1(a) | 1(b)/1(c) | 2(a) | 2(b) | 3 | 4 | 5 | 6 | 7(a)/7(b) |
|---|---|---|---|---|---|---|---|---|
| Flat | Dwelling-houses | Hospital, home, school | Hotel, boarding house, residential college, hall of residence, hostel or any other | Office | Shop and commercial | Assembly and recreation | Industrial | Storage and other non-residential |

This table is only representative. For all the rules, please refer to **ADB** in full.

## 6.3 BUILDING SHAPE, SIZE ETC

Following through ADB, compartmentation and thus fire damper selection is further influenced by the size and shape of a building.

**Fig No. 3— Shapes & Heights**



Tables on compartmentation requirements in terms of fire resistance are described within **ADB** and they vary with floor area, height, depth of basement and other parameters. The use of these parameters and their selection needs to be understood to prevent incorrect product selections. Often this should be addressed by the fire strategy, but the ability to be able to discuss a fire strategy from a position of understanding will be very useful. It will also allow the designer selecting the products to understand what onward effects the wrong selections might cause.

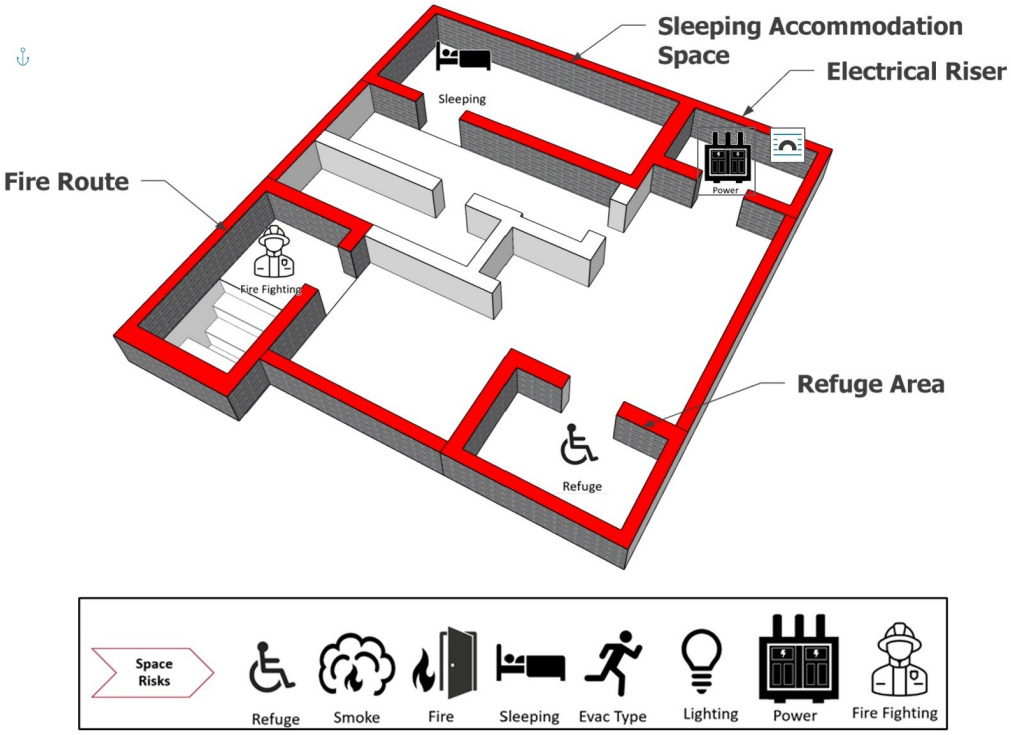
The fire resistance at various points will determine the fire resistance time period of the fire damper.

Positioning of the duct installation either vertically or horizontally will influence the selection of the fire damper classification.

## 6.4 SPECIAL REQUIREMENTS FOR SPECIFIC RISKS IN PARTICULAR SPACES WITHIN A BUILDING

The designer must determine the risks associated with all the different spaces/areas within the building.

**Fig No. 4 — Form and Space Type Diagram high lightening Space Risks**




This plan diagram is not what would be used in practice but is used to simply identify certain risks. There will be storey sizes which could affect escape distances. The plan shows a firefighting stair, a refuge area , some power risers and people sleeping

So, we must consider the following risks; refuge risk, smoke risk, fire risk, sleeping risk, evacuation risk, lighting risks, power risks and firefighting risks.

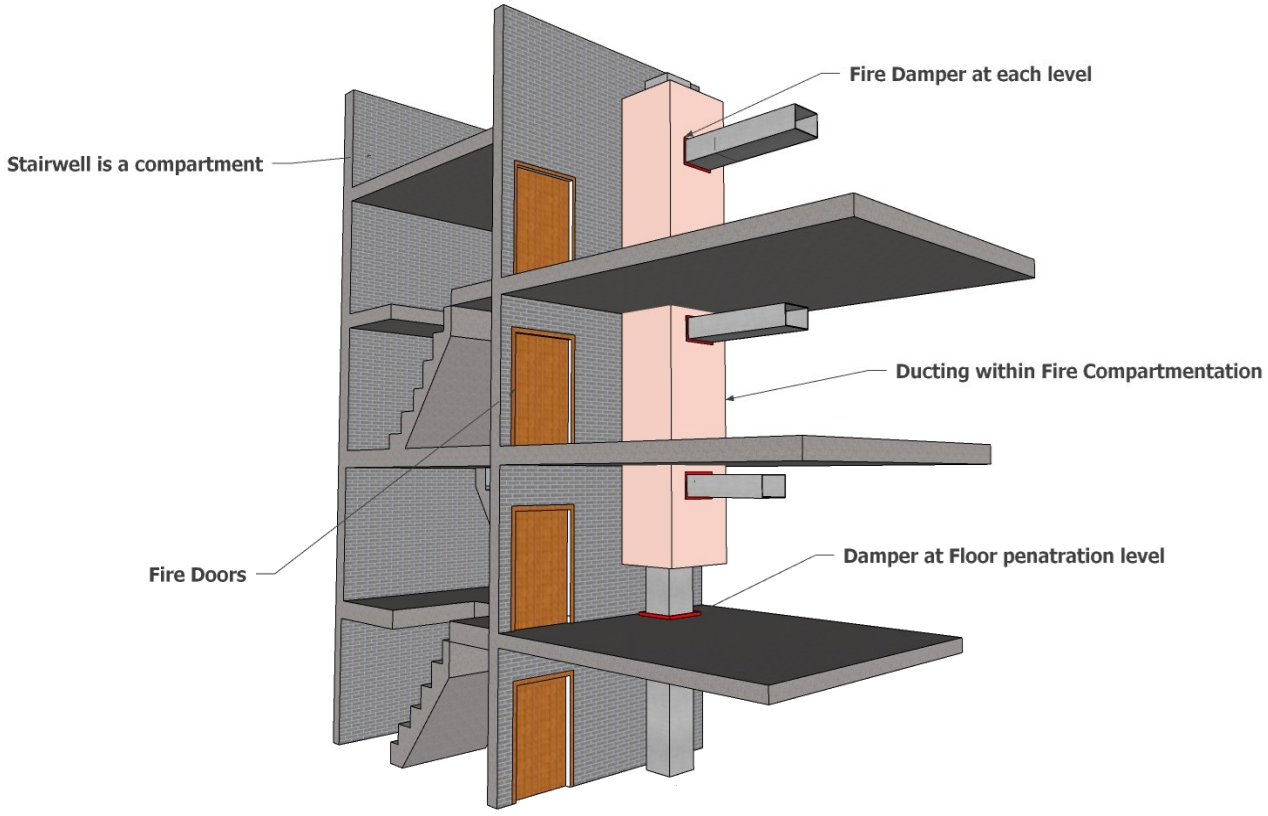
Therefore, there are a lot of risks to consider, but specifically for fire damper selection these will be fire, smoke, sleeping and means of escape. So an **E classification** fire damper (FD) will not be acceptable here, it must be an **ES** classified Motorised Fire Damper (MFD).

But refuges and the mode of evacuation (e.g. stay put, phased, simultaneous) should perhaps also be considered in the choice of fire dampers used in these areas.

Insulation is not a general requirement in the UK, but if there were to be a possibility of people or combustible goods within 500mm of the fire damper then an Insulation (I) classification might be considered appropriate.

As a reminder, design is not simply about following a prescription and the guidance, it is also about the practical aspects of what might occur. If you are part of the fire damper selection team think of yourself as the person escaping, the person sat in a refuge and as a firefighter approaching the fire and spend some time looking from these perspectives.

**Fig No. 5—Design for FD Selection**



# 7 FIRE DAMPER INSTALL METHODS AND SPACE REQUIREMENTS (IN THREE DIMENSIONS)

Fire dampers are only a single component. They are part of a system to maintain compartmentation. If installation instructions are not followed then any one item can lead to a failure of compartmentation – i.e. the fire might simply go round the outside of the fire damper. The fire damper closing is only one part of fulfilling the compartmentation.

Always think of the fire damper installation in three dimensions and allow space for the whole install. Miss out a seal on one side and that is where the fire will pass.

There are many examples of fire damper install methods. However, in every case the fire damper manufacturer's installation instructions must be followed. Each one may have, for example: a different hole size, fixings at different centres etc.

**DO NOT SIMPLY FOLLOW THE INFORMATION GIVEN HERE, YOU WILL PROBABLY GET IT WRONG**

**Specifications should always refer to manufacturer's installation instructions.**

The following are a guide to show you what to consider in terms of applications to different wall types, not to be used in specifications etc. **Specifications should always refer to manufacturer's installation instructions.**

Some of these types are listed with more information on the next few pages. Some manufacturers may vary.

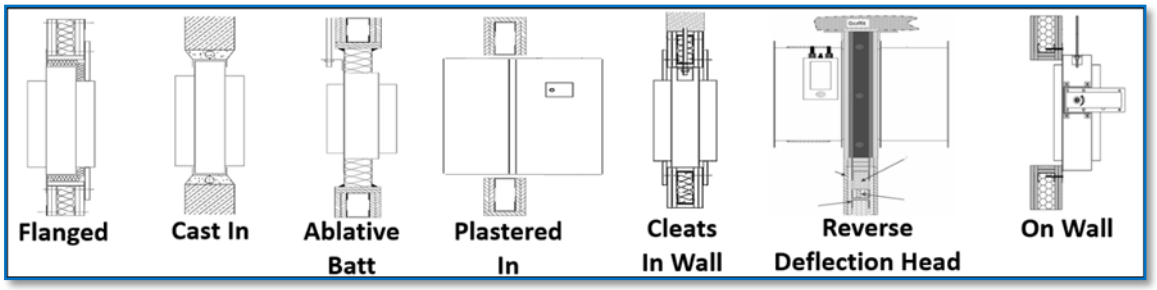
It is possible to have an out of wall installation if it has been tested. However the duct connected through the wall must comply exactly with the manufacturer's instructions as will any fire damper installation. If this is to be used, both the method and the manufacturer need to be clearly specified.

There are limits at which fire dampers may be mounted close together and how close to adjacent walls and floors. Some are allowed but must have been determined by testing – refer to specific manufacturer's installation instructions.

Different walls may also have restrictions to how close you can go to the edge. There are also filled gaps at the tops of some walls to allow for deflection. All this information needs to be checked with the wall suppliers and their instructions followed.

In some cases, larger units may be constructed from smaller individual sections- again, refer to specific manufacturer's instructions to see what you can use.

**Fig No. 6— Examples of Installation Methods**



## 7.1 FIRE DAMPERS— FLANGED

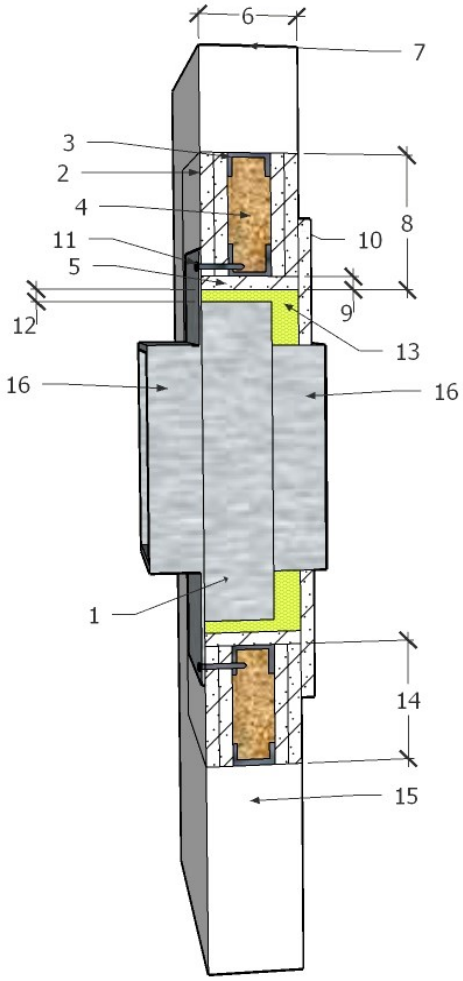
### 7.1.1 GENERAL

Flanged Dampers are made by some manufacturers and they can be either MFD's or FD's. These fire dampers, generally, are installed by screwing the flange into the supporting stud work of the wall system, which need to be verified as being able to take the weight and the size. They could also be installed within a rigid structure if the damper has been tested within a flexible wall under the direct field of application (DIAP) rules. They will be supplied with two sets of screw holes, one for drywall and one for rigid applications. Installation access is generally from both sides and the penetration seal is normally completed by the drywall contractor or the PFP contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 7.1.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 7—Fire Dampers—Flanged**



## 7.1.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 7**

| | |
|---|---|
| **GENERAL—FLANGED** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture (lining out), type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of the aperture (lining out) board |
| 10 | Penetration Seal Pattress detail information. Material, thickness, fixings screws, mastics and Length |
| 11 | Damper fixing details including the screw types, any drop rods supports and positions. |
| 12 | Penetration Seal Pattress detail information. Maximum and minimum depths. (If required) |
| 13 | Penetration Seal Fill detail information. Material, density, thickness, mastics and depth. |
| 14 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 15 | Type of construction that the wall is attached to and its classification information |
| 16 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classification requires power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides [Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 7.2 FIRE DAMPERS— CAST IN

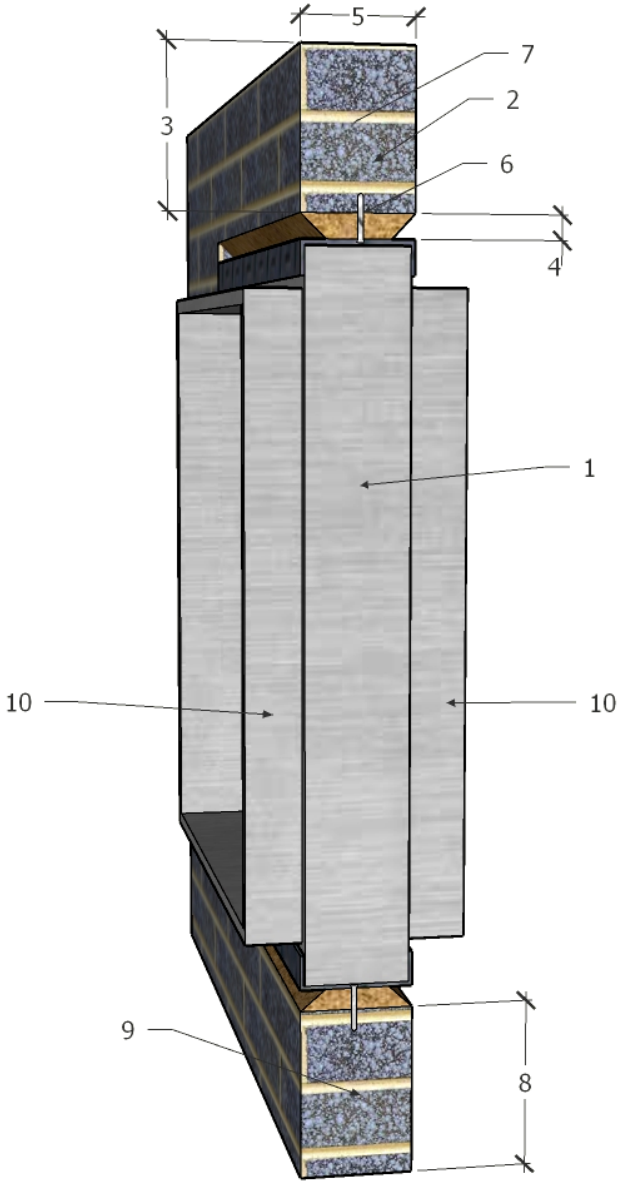
### 7.2.1 GENERAL

HEVAC Frame dampers are made by some manufactures and they can be either MFD's or FD's. These dampers generally cast into rigid constructions using a 4:1 sand and cement mix and cannot be used in flexible constructions under the DIAP rules. They have specific tolerances around the damper to the supporting constructure that needs to be accounted for within the design. Installation access is from both sides and the penetration seal is generally completed by the blockwork contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 7.2.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 8— Fire Dampers—Cast In**



## 7.2.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 8**

| No. | GENERAL - CAST IN |
|---|---|
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information (rigid walls concrete or block/brick) |
| 3 | Deflection details. The rigid wall deflection head size for the wall to be fire safe |
| 4 | Type of penetration seal used, thickness and density. |
| 5 | Thickness of the wall. |
| 6 | Insert pins into the construction and wire back to the damper builders ties |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 9 | Type of construction that the wall is attached to and its classification information |
| 10 | Details of the break away joint materials. |
| | **PENETRATION INSTALLATION** |
| a | Access required from both sides |
| b | Infill material 4:1 sand/cement |
| | **PRESCRIPTIVE** |
| c | Identify the space that the Fire Damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| | **RELATIONSHIPS - SEE FIGURE** |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (5) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (4) must be as the damper test limits |
| j | Wall thickness. As defined by the gap seal depth (5) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (4) must be as the damper test limits |
| l | Deflection: Applicable to the flexible wall manufacturers requirements (3) for the fire safety of the wall. |
| m | No Deflection: Applicable to the flexible wall manufacturers requirements (3) for the fire safety of the wall. |
| n | Wall |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| | **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 7.3 FIRE DAMPERS— ABLATIVE BATT

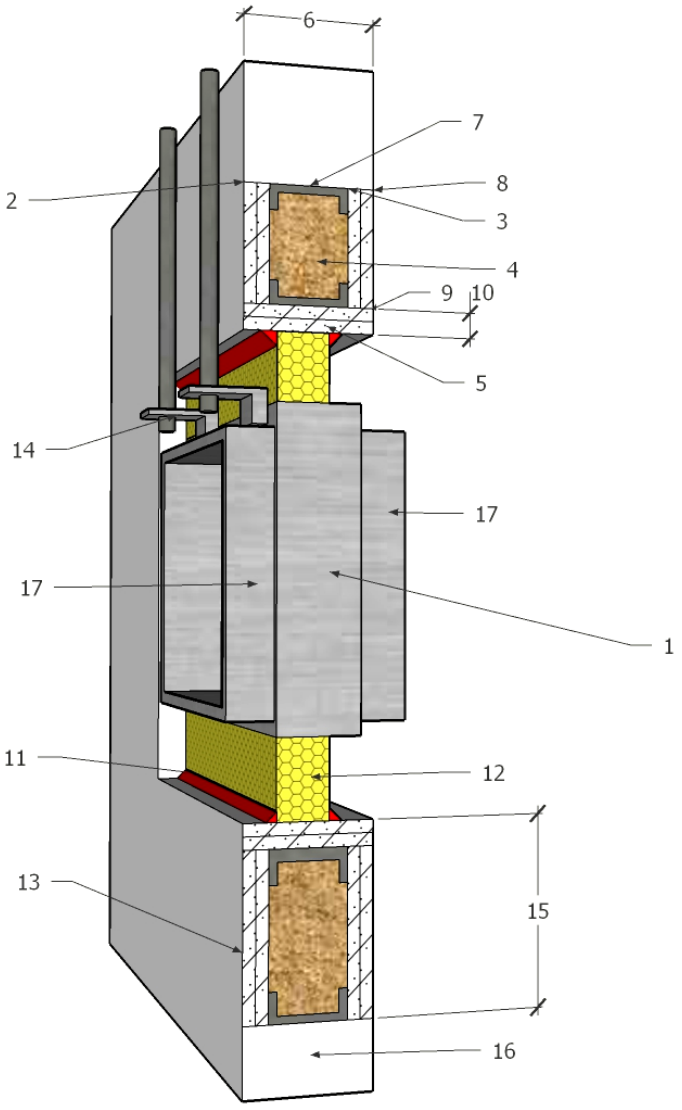
### 7.3.1 GENERAL

Ablative Batt penetration seal solutions for fire dampers are provided by some manufacturers and they can be either MFD's or FD's. With hanger support these fire dampers may be installed in different wall types in an oversize hole with the penetration seal being formed with ablative batt. Installation access is generally from both sides and the penetration seal is normally completed by the drywall contractor or the PFP contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 7.3.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 9— Fire Dampers—Ablative Batt**



## 7.3.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 9**

| | |
|---|---|
| **GENERAL - ABLATIVE BATT** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture (lining out), type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of the aperture (lining out) board, number of boards |
| 10 | Penetration Seal depth information. |
| 11 | Damper seal sealant details, type, classification, thickness applied. |
| 12 | Penetration Seal material type, thickness, fixings, coatings and Length |
| 13 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 14 | Damper support connection information. Dual nuts or single and size. |
| 15 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 16 | Type of construction that the wall is attached to and its classification information |
| 17 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the Fire Damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Fire damper |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (10) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 7.4 FIRE DAMPERS— GYPSUM MORTAR

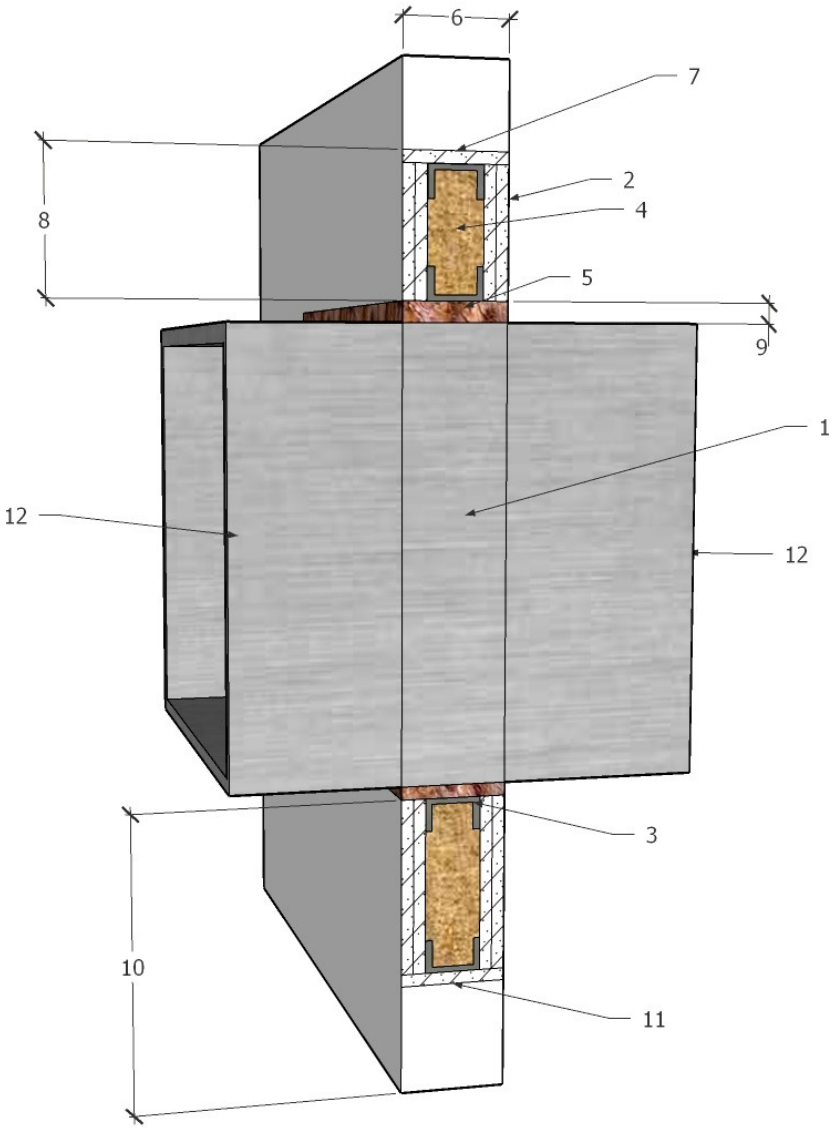
### 7.4.1 GENERAL

Gypsum plastered in penetration sel solutions for fire dampers are provided by some manufacturers and they can be either MFDs or FDs. These dampers can generally be installed into flexible walls using gypsum plaster. This is not the same as refractory compounds and advice should be sought from the fire damper manufacture. If they are tested within a flexible wall, they could be used in a rigid construction under the DIAP rules. Installation access is from both sides and the fire seal is normally done by the drywall contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 7.4.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No.10 —Fire Dampers—Gypsum Mortar**



## 7.4.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No**. **10**

| | |
|---|---|
| | **GENERAL—GYPSUM MOTAR** |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Material used within the aperture and its density |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of plaster material required |
| 10 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 11 | Type of construction that the wall is attached to and its classification information |
| 12 | Details of the break away joint materials. |
| | **PENETRATION INSTALLATION** |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| | **PRESCRIPTIVE** |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classification require power and fire alarm interfaces. |
| | **RELATIONSHIPS** |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| | **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 7.5 FIRE DAMPERS— REVERSE DEFLECTION HEAD

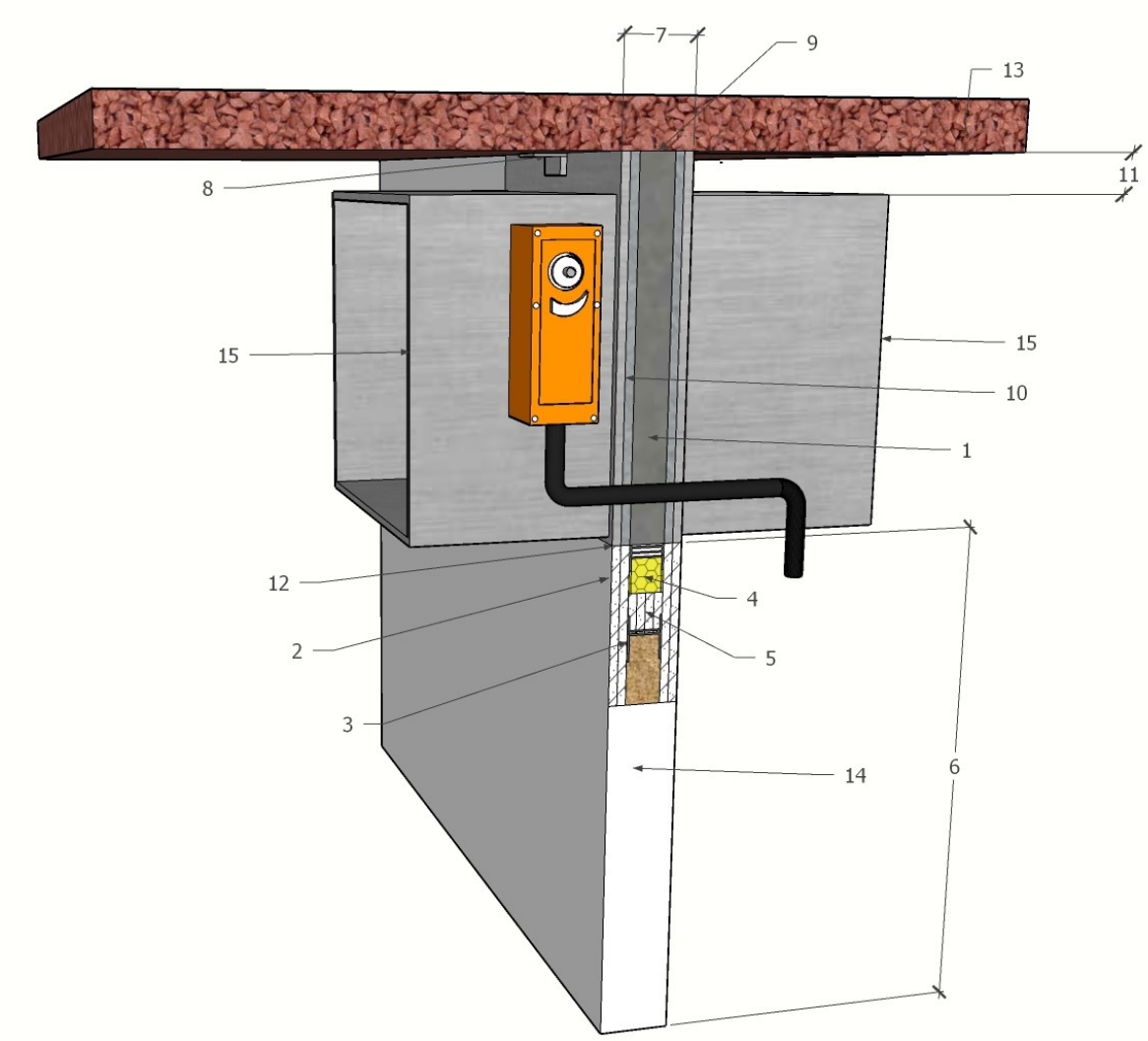
### 7.5.1 GENERAL

Reverse deflection head dampers are provided by some manufacturers and they are normally MFD's only. These dampers are generally soffit fixed into the concrete slab and are sealed within the wall aperture generally using a specialist installation kit supplied with the fire damper. They are tested within a flexible wall but cannot be installed into rigid structures, as the deflection head must be moved below the damper into the wall void. The materials used for the infill kit are specific to the manufacturer, they are not to be treated as generic. Installation access is from both sides and the work must be carried out by a competent drywall contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 7.5.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 11— Fire Dampers—Reverse Deflection Head**



## 7.5.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No**. **11**

| | |
|---|---|
| **GENERAL—REVERSE DEFLECTION HEAD** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture, type of board, layers, thickness. |
| 6 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 7 | Thickness of the wall. |
| 8 | Deflection details. Top details fixed from the deflection kit |
| 9 | Seal material, density and type |
| 10 | Damper deflection kit (specific to manufacturer) |
| 11 | Depth of allowable deflection (specific to manufacturers kit) |
| 12 | Penetration Seal Material type, thickness, fixings, coatings and Length etc (specific to manufacturer) |
| 13 | Type of construction that the wall is attached to and its classification information |
| 14 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 15 | Details of the break away joint materials. |
| PENETRATION INSTALLATION | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| PRESCRIPTIVE | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 7.6 FIRE DAMPERS— BUILD IN CLEATS

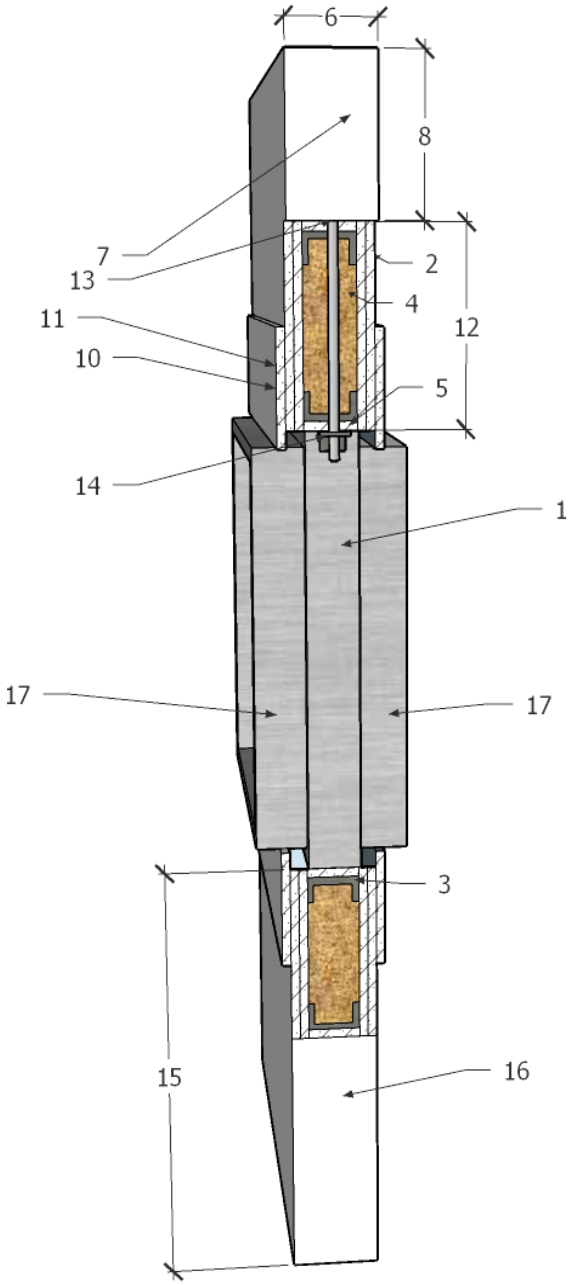
### 7.6.1 GENERAL

Fire dampers with cleats are supplied by some manufacturers and they can be either MFD's or FD's. These fire dampers are generally installed by supporting the fire damper with cleats and hangers within the flexible wall line. The flexible wall is then built around the fire damper. Installation access is generally from both sides and the penetration seal is normally complied by the drywall contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 7.6.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 12— Fire Dampers—Build In Cleats**



## 7.6.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 12**

| | |
|---|---|
| **GENERAL - BUILD IN CLEATS** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture, type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Thickness of the construction. i.e. slab or lintel. Rigid generally only used. |
| 9 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 10 | Penetration Seal Pattress detail information. Material, Density, Thickness, mastics and depth. |
| 11 | Pattress fixing type. Type length etc. |
| 12 | Penetration seal depth. |
| 13 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 14 | Damper support connection information. Dual nuts or single and size. |
| 15 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 16 | Type of construction that the wall is attached to and its classification information |
| 17 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| QUALITY HOLD POINTS [Q] AND **BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

## 7.7 FIRE DAMPERS— ON WALL SURFACE

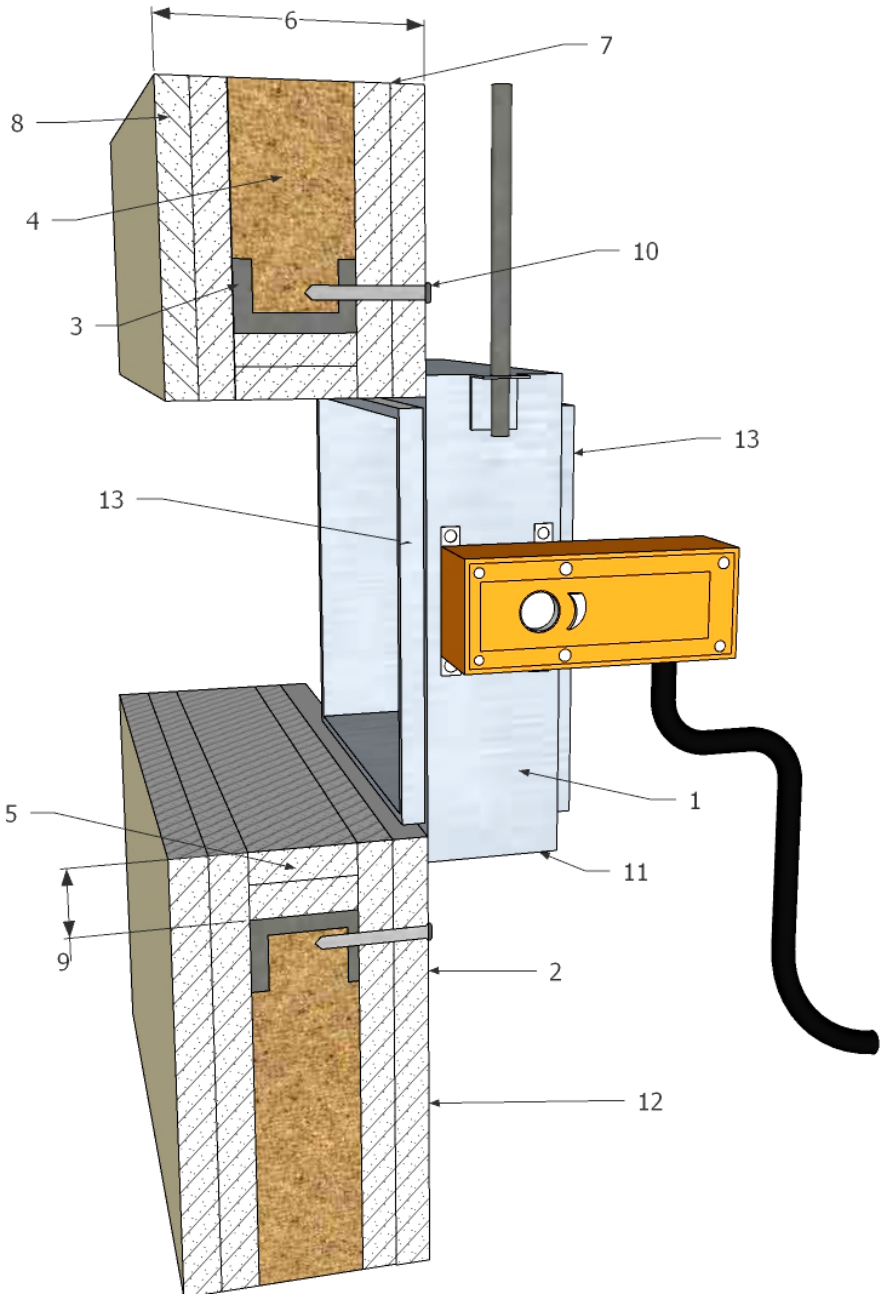
### 7.7.1 GENERAL

Wall surface fire dampers are provided by some manufacturers and they can be either MFD's or FD's. These fire dampers are generally installed by fastening the flange onto the wall construction with the fire damper out of the wall, additionally supported with hangers. They could also be installed within a rigid structure if the damper has been tested within a flexible wall under the DIAP rules. Installation access is generally from both sides and the fire seal is normally done by the ductwork, drywall contactor or the PFP contractor.

**Note: Drawing below is representative only and the manufacturer tested install details must be referred to.**

### 7.7.2 WHAT NEEDS TO BE CHECKED AND RECORDED

**Fig No. 13— Fire Dampers—Wall Surface**



## 7.7.2 WHAT NEEDS TO BE CHECKED AND RECORDED

Key to **Fig No. 13**

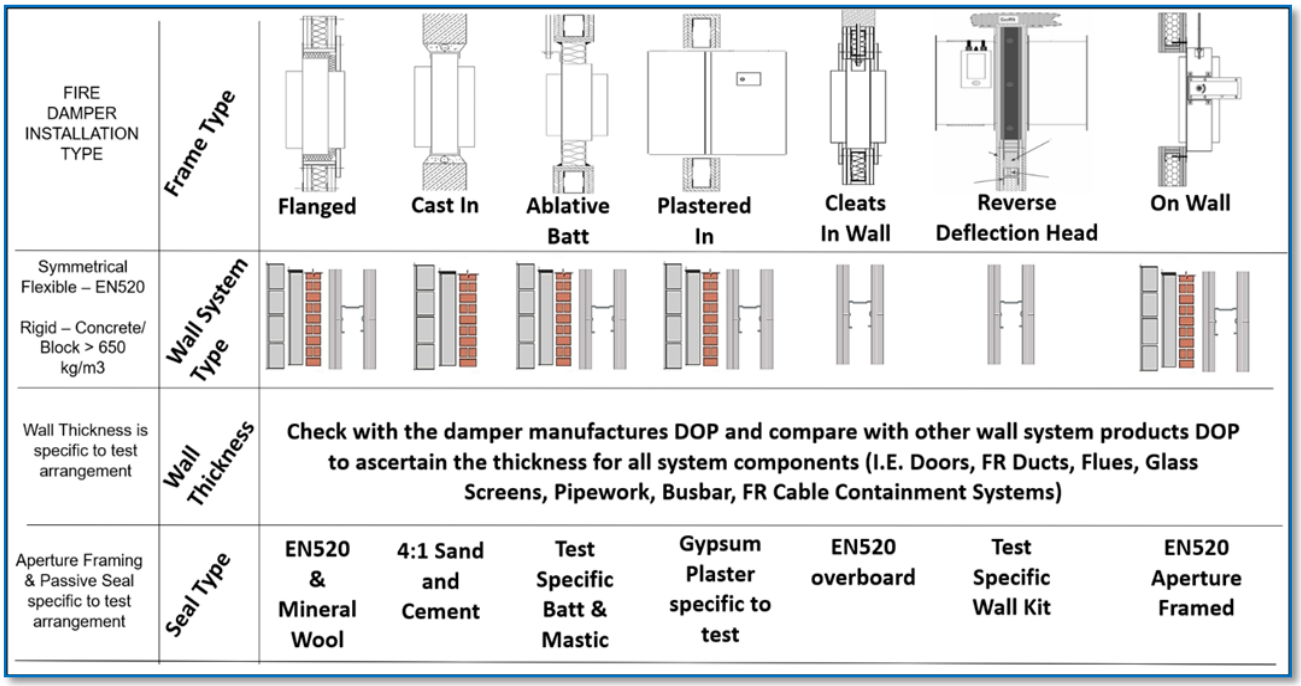
| | |
|---|---|
| **GENERAL— ON WALL SURFACE** | |
| 1 | Fire Damper Classification Information, manufacturer, material type |
| 2 | Standard Supporting Construction Classification information, type of board, layers, thickness. |
| 3 | Stud Type used and width |
| 4 | Type of insulation used, thickness and density (not required for the performance of the damper if not installed) |
| 5 | Board within the aperture (lining out), type of board, layers, thickness. |
| 6 | Thickness of the wall. |
| 7 | Type of construction that the wall is attached to and its classification information |
| 8 | Deflection details. The partition wall deflection head size for the wall to be fire safe |
| 9 | Thickness of the aperture (lining out) board |
| 10 | Damper fixing details including the screw types, any drop rods supports and positions. |
| 11 | The minimum amount of wall beneath the damper for the wall to be fire safe. |
| 12 | Type of construction that the wall is attached to and its classification information |
| 13 | Details of the break away joint materials. |
| **PENETRATION INSTALLATION** | |
| a | Access required from both sides |
| b | Infill material or air gap (13) as the damper test. |
| **PRESCRIPTIVE** | |
| c | Identify the space that the fire damper serves and whether it requires an E or an E.S classification |
| d | Ensure the E and E.S classification is appropriate to the wall or floor classification. |
| e | S classifications require power and fire alarm interfaces. |
| **RELATIONSHIPS** | |
| f | Horizontal distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| g | Vertical distance between dampers within walls. 200mm or as defined by the wall system fire requirements |
| h | Wall type. Symmetrical flexible partitions to BS EN 1364-1 |
| i | Wall type. Asymmetrical Flexible partitions to BS EN 1364-1 (these should have test evidence) |
| j | Wall thickness. As defined by the gap seal depth (7) through the wall within the damper test. Cannot be less |
| k | Aperture size depth within the wall (12) must be as the damper test limits |
| l | Aperture: layers of board (5) must be as the damper test |
| m | Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| n | No Deflection: Applicable to the flexible wall manufacturers requirements (8) for the fire safety of the wall. |
| o | 3 sided installation: No |
| p | Break away joints as manufacturers IOM |
| **QUALITY HOLD POINTS [Q] AND BENCHMARKS [B]** | |
| i | Wall type, depth, thickness and aperture framing as per the tested damper [Q] |
| ii | Fire damper mounted within the aperture [Q] |
| iii | Wall penetration seal pictures both sides[Q] |
| iv | Break away joints and TR 19 Access hatches [Q] |
| v | Any motor, power and connections and ductwork Insulation [Q] |
| vi | Drop Test [Q] |
| vii | Final installed unit complete within the wall [B] |

# 8 DETERMINE THE TYPES OF WALLS, FLOORS AND SHAFTS

## 8.1 GENERAL

The next item to be checked is the wall type. **This is probably the most important issue**. It determines the fire resistance time required for the fire damper and dictates the installation type to be used.

**Fig no. 14— Types of Walls vs Installations**




It may be seen from the figure that not all installation types are suitable for all walls, so a bad specification can lead to the wrong unit being selected.

As noted in the previous sections, compartment barriers have their own requirements with regard to how close penetrations can go to the edges, particularly flexible board walls.

You may need to address these issues by changing ventilation drawings so that there is room to fit the fire dampers. Note that the hole required to fit the fire damper is usually considerably larger than the nominal duct dimensions and varies by manufacture. Holes in flexible walls will normally need lining out so making a requirement for a larger initial hole.

**This is not a comprehensive guide.**

**You must follow the fire damper and wall manufacturer's instructions.**

## 8.2 STANDARD COMPARTMENT BARRIER CONSTRUCTIONS

### 8.2.1 HIGH DENSITY RIGID CONSTRUCTION

Blockwork, masonry or homogenous concrete wall with an overall density of (1200 ± 400) kg/m3 and a thickness of (200 ± 50) mm.

### 8.2.2 LOW DENSITY RIGID CONSTRUCTION

Aerated concrete block wall with an overall density of (650 ± 200) kg/m3 and a thickness 2'. 70 mm.

### 8.2.3 FLEXIBLE CONSTRUCTION

Lightweight plasterboard faced steel stud partition

Rolled steel track and stud covered with paper faced, gypsum plasterboard type F (EN520) fixed to each side of the framework as follows:

**Table No. 3— Standard Flexible Construction—Extract from EN 1363-1:2020**

| Intended Fire Resistance | Nominal steel stud depth [mm] | | | Gypsum boards type F EN 520 | | Insulation: Mineral wool | |
|---|---|---|---|---|---|---|---|
| | Group A | Group B | Group C | Number of layers at each side | Thickness of boards [mm] | Thickness [mm] | Density [kg/ $m^{3]}$ |
| EI 30 | 44 to 55 | 56 to 75 | 76 to 100 | 1 | 12,5 | 40 to 50 | 30 to 60 |
| EI 60 | 44 to 55 | 56 to 75 | 76 to 100 | 2 | 12,5 | 40 to 50 | 30 to 60 |
| EI 90 | 44 to 55 | 56 to 75 | 76 to 100 | 2 | 12,5 | 40 to 50 | 85 to 115 |
| EI 120 | 62 to 70 | 71 to 75 | 76 to 100 | 2 | 15 | 60 to 70 | 85 to 115 |

### 8.2.4 DIRECT FIELD OF APPLICATION (COMMONLY KNOWN AS DIAP)

Test results obtained with dampers installed in flexible vertical supporting constructions may be applied to rigid supporting constructions of a thickness equal to or greater than that of the element used in the tests, provided that the classified fire resistance of the rigid supporting construction is greater than or equal to the one used for the test.

The sealants used shall be the same as those tested. Any fasteners used shall be fire rated to suit the supporting construction that is used as per manufacturer install methos.

## 8.3 NON-STANDARD COMPARTMENT BARRIER CONSTRUCTIONS

### 8.3.1 GENERAL

When a fire damper specimen is intended to be used in a barrier not covered in the previous section, it must be tested within the barrier in which it is prescribed to be provided.

### 8.3.2 FLOORS

The standard floor constructions are generally concrete in various densities. Composite steel decking supported concrete floors may be an issue and clarification of fire dampers to be installed in this construction need to be determined early.

Wood construction floors, found in historic buildings for instance, also need to have fire damper installation methods confirmed.

### 8.3.3 WALLS/SHAFTS

Standard solid walls are again usually of concrete and block construction. Standard flexible walls (tested) are normally one or two layers of board on a steel stud. The boards will generally be those tested to EN 520, type D and F.

If the structure of the wall differs, for instance shaft type walls, asymmetrical, with differing layers on both sides and boards perhaps fitted inside what will become effectively unprotected studs are not covered by direct field testing rules – refer again to the previous figure.

This means that independent specific test evidence will be required for these installations. This must be determined by the designer and perhaps a specific fire damper manufacturer selected. It will not be possible to change this during the construction phase or find alternatives at this late stage.

### 8.3.4 PROTECTED CELLULAR BEAMS WITH FLEXIBLE WALL CONSTRUCTION

Cellular beams are often seen as a good way for running services at high level. If they are on a compartment line it is not possible to run ductwork even of small sizes through them. There are no installation methods for fire dampers in these positions and the beams themselves need to be protected. If a flexible wall or even a solid wall construction is then built up to these beams there will be requirements for a deflection head and no services being within a certain distance of the edges, so a duct will then potentially need to be re-routed and dropped down quite a long way to go under beams of this sort. This should be checked before the design proceeds too far.

### 8.3.5 EXTENDED FIELD OF APPLICATION (COMMONLY KNOWN AS EXAP)

There are no EXAP rules that can be applied to installation methods or differing compartment barrier constructions

# 9 SELECT FIRE DAMPERS USING THE PRECEDING INFORMATION

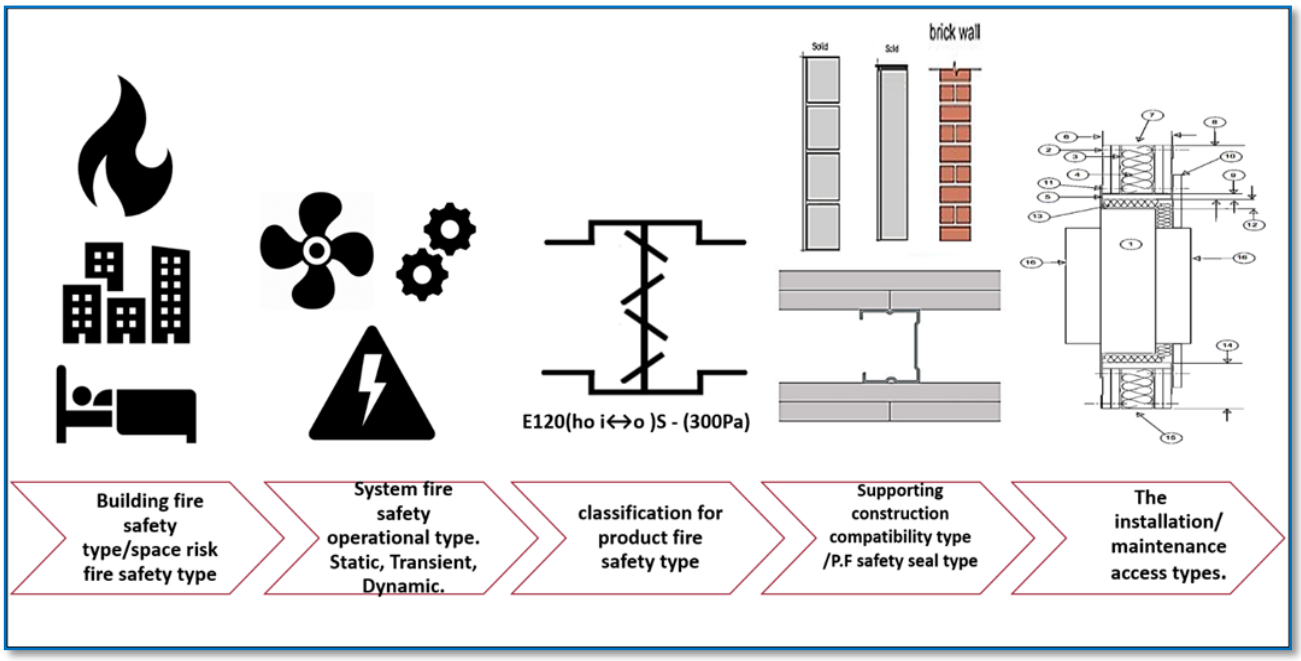
Using all the information acquired to this point, the selection of the fire dampers can commence.

As a warning, it is not possible to leave this until late in the project. If the walls are not suitable for the fire damper this cannot be fixed at a later stage. The situation has changed in recent years, because where problems were “fixed” on site or simply overlooked, this practice is no longer available. Assessments or “sign-off” from a manufacturer or building control is no longer adequate. The responsibility will rest with the designer. So if there is not enough space to fit a product the designer will be expected to change the design. **The design needs to be right first time.** Changes late in the day always cost disproportionately. There are few, if any, late fixes available to “sort things out”.

The first figure shows the overall process to getting to the selection and specification.

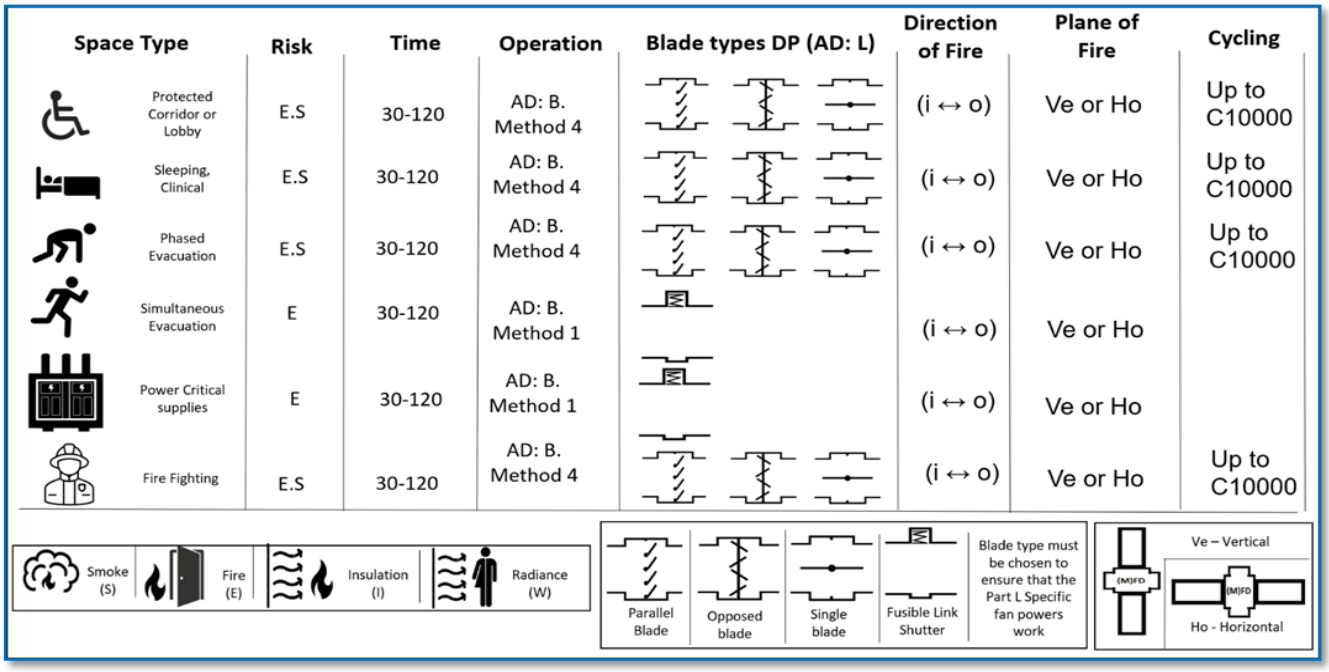
As the designer you will need to collate all this information together and present it as a design.

**Fig No. 15— Selection Flowchart**



The following figure shows the decisions needed to be made about the damper relating to guidance, risk, operation, pressure drop, etc.

**Fig No. 16— Decision Tree**

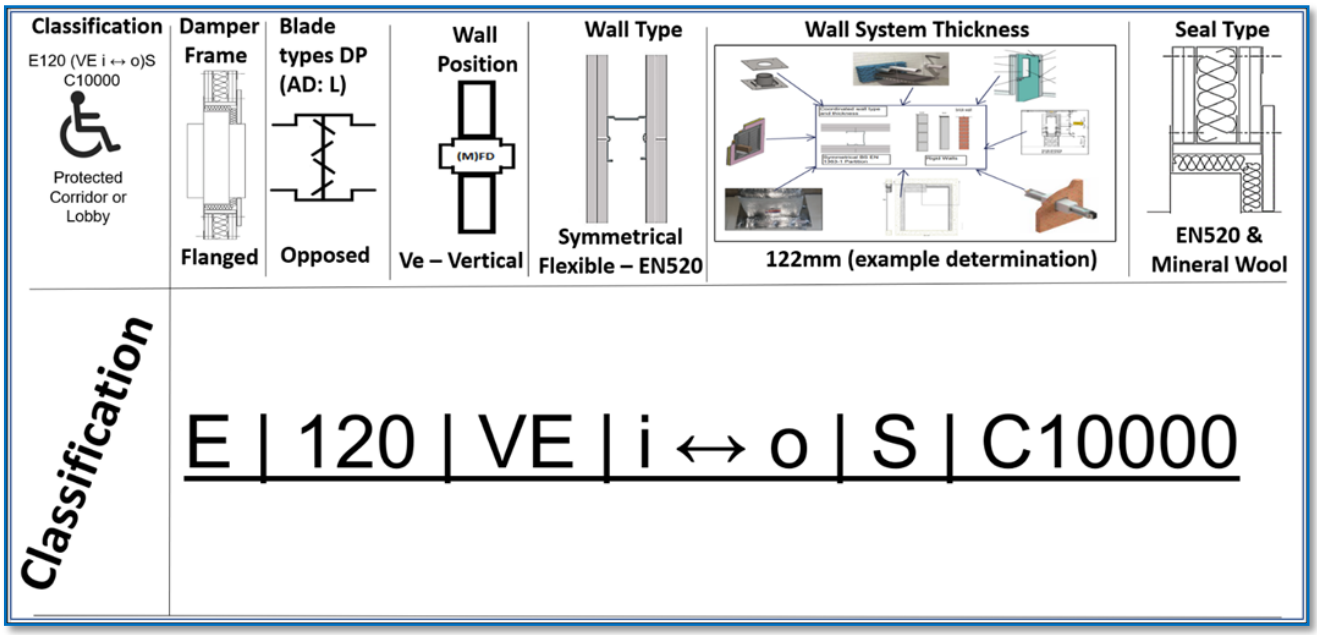



As prescribed in **ADB** etc, the fire damper fire resistance period must always match the construction of the compartment barrier, which in turn must match the specified fire compartmentation times.

Due to the application and positioning of a fire damper a designer may want to select an insulation classification. This is optional and not an **ADB**, **BS9991** or **BS9999** requirement, but might suit specific areas where transmission of heat could cause an issue for example, a paper store.

A **Declaration of Performance (DoP)** from the fire damper manufacturer will be required to demonstrate the performance of the particular fire damper model in the specific fire compartment barrier with a time classification and showing the full classification. An example is as follows:

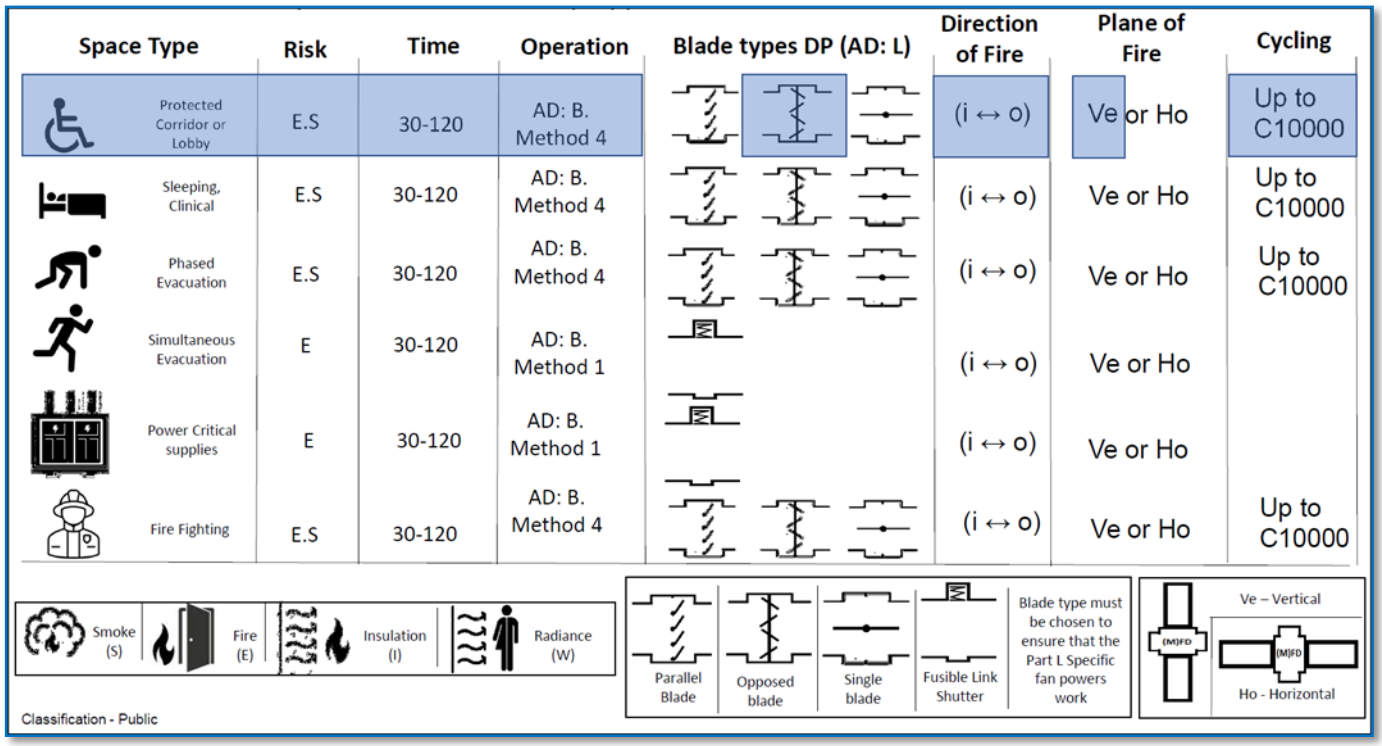
**Fig No. 17— Fire Damper Classification**



# 10 EXAMPLE PROCESS

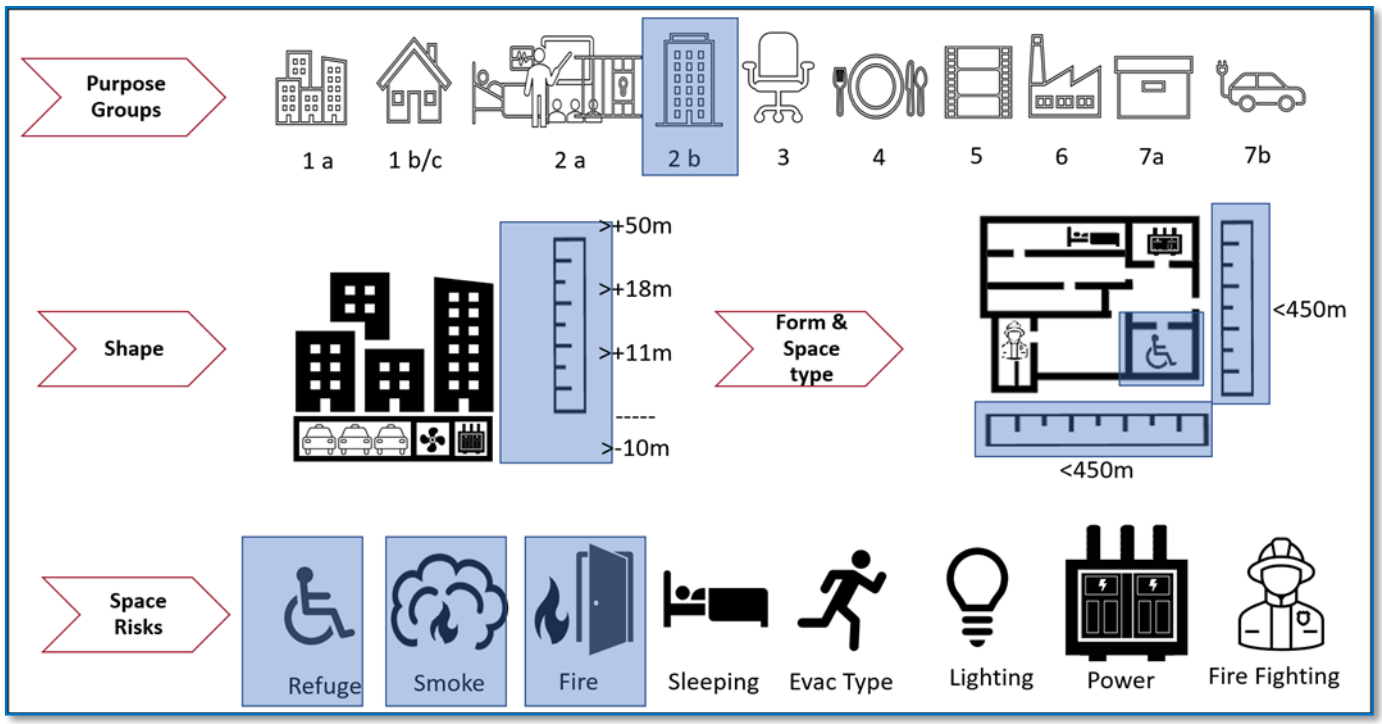
## 10.1 SELECT PURPOSE GROUP, SHAPE, SPACE TYPE, SPACE RISKS

**Fig No. 18—Example Process (1)**



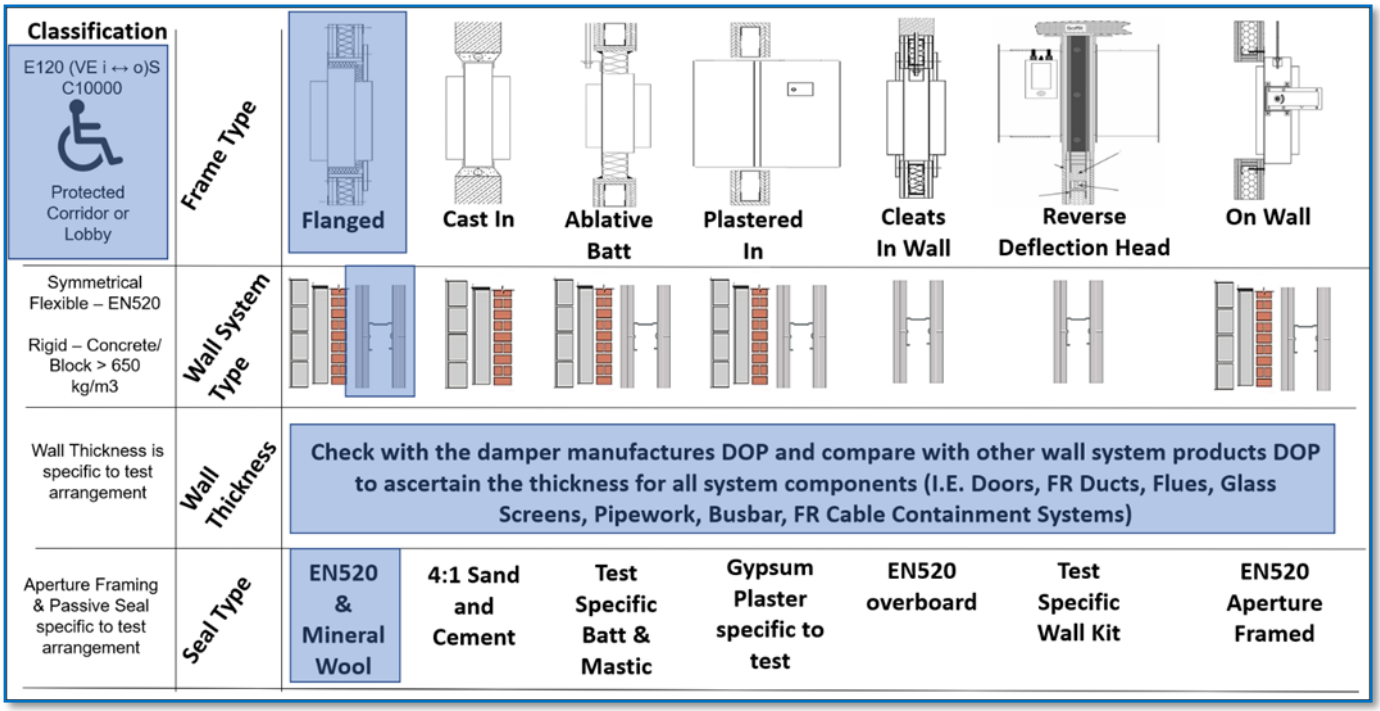

## 10.2 SELECT TIME, OPERATION, BLADE TYPES, PLANE, CYCLING

**Fig No. 19—Example Process (2)**



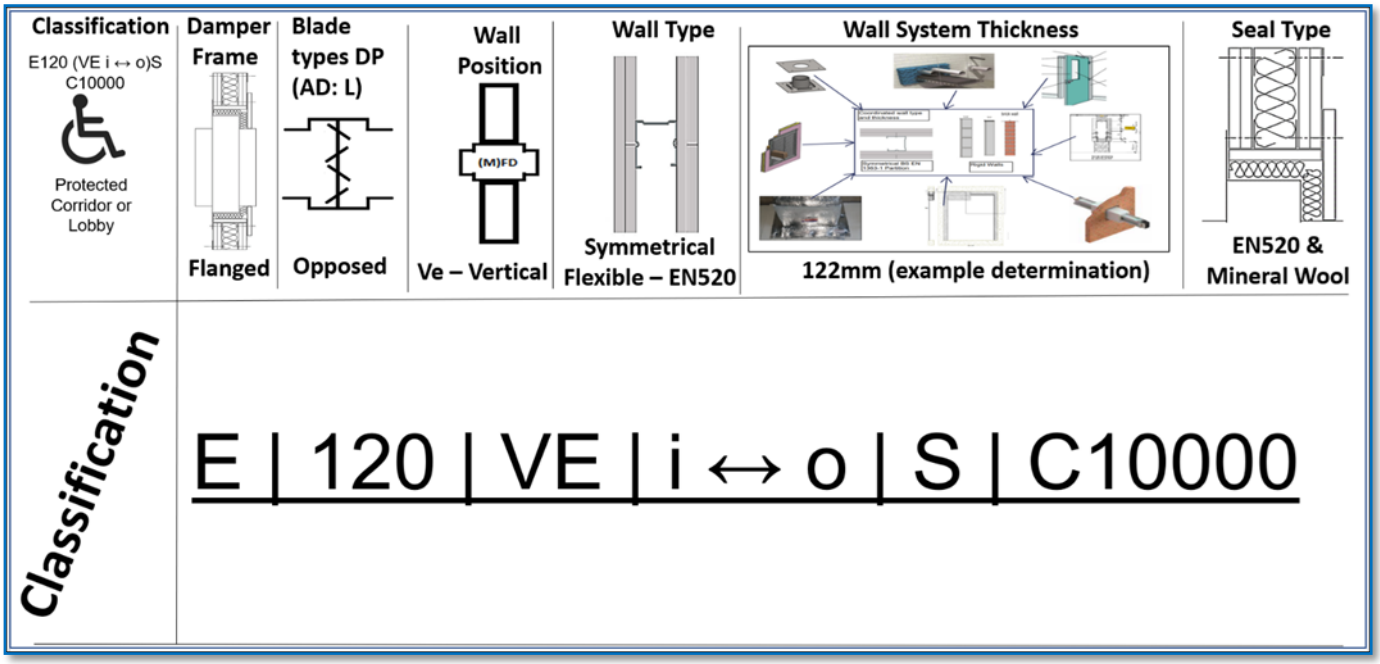
## 10.3 SELECT INSTALLATION METHOD, WALL TYPE, PENETRATION SEAL

**Fig No. 20—Example Process (3)**




## 10.4 RESULTING SPECIFICATION AND CLASSFICATION

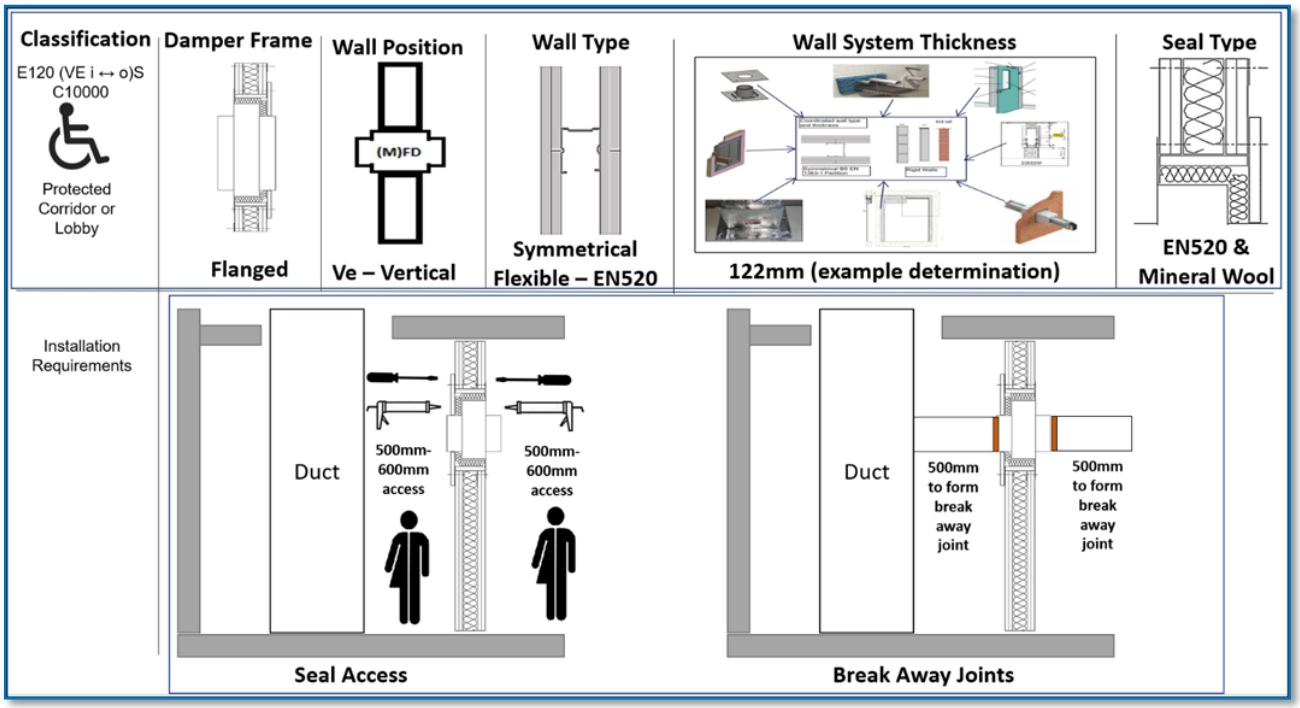
**Fig No. 21— Example Process (4)**



# 11 ENSURE THAT ACCESS IS AVAILABLE BOTH BEFORE AND AFTER INSTALLATION

Remember that access is required to both sides of the fire damper for installation, checking, cleaning and maintenance and ductwork cleaning.

**Fig No. 22— Access Before, During and After Installation**




Access doors should be provided on both sides of the fire damper for future maintenance and cleaning of both the fire damper and the ductwork.

Fire dampers need breakaway joints that will allow the duct to collapse and stop it from pushing the fire damper out of the wall during a fire. These can take the form of flexible connectors, or the use of aluminium rivets as specified by the manufacturer. The use of steel rivets and particularly self-drilling screws should be specified not to be used. The latter have an on-going health and safety risk, as they leave a particularly sharp cut hazard within the duct, which puts inspectors and cleaners at risk. Access doors should also not be fitted with these screws for the same reason.

**Please note:** High Velocity Ductwork must not be butted against the fire damper body for sealing purposes, otherwise on expansion it will breach the fire compartment.

All this information needs to be checked against the ventilation layouts and services coordination drawings to ensure that installation and access are all possible. Again, it will be very difficult if a shaft is so small it does not provide access to fit a fire damper penetration seal correctly or later to provide access if a containment tray is fitted directly under an access panel.

# 12 PROVIDE INFORMATION FOR EACH METHOD OF INSTALL REQUIRED ON A PROJECT

Having selected the fire dampers, then it is necessary to provide a design detail for each wall type of wall construction. For example:-

> 10 wall types will require 10 design details and perhaps 20 design details if both **E** and **ES classification** fire dampers have been selected to go in each wall type. The installation method may vary for each, so it is best to cover each one.

There may be one manufacturer for the **E classified** fire dampers and another for the **ES classified** fire dampers.

And remember the space constraints, deflection heads, etc.

Non-standard wall constructions such as shaft wall, will need specific details and potentially specific fire damper models and manufacturers.

In addition, provide a **Declaration of Performance (DoP)** for each method and both the installation and maintenance instructions.

> **Require the installer to have third party certification with personnel having individual competency certification.**
>
> **Require that the installer takes photographs during the install to show that all the hidden installation details have been addressed.**

# 13 DESIGN SCHEDULE WITH A DISCRETE ASSET REFERENCE SHOWING DAMPER TYPE AND INSTALLATION METHOD REQUIREMENTS

Going forward the collection of data electronically **(Golden Thread)** will become the norm. Providing information for each fire damper asset in this way provides information for all parties involved.

The information should be in tabular form and have a minimum of all the following information:

a. Fire damper asset reference
b. Space risk
c. Compartment boundary type (floor shaft, wall)
d. Fire damper manufacturer
e. Installation/seal type
f. Classification
g. Blade type
h. Power/feedback requirements

# 14 THE KNOWLEDGE AND UNDERSTANDING THAT YOU NEED TO DESIGN FOR AND SELECT FIRE DAMPERS

You will need to demonstrate an understanding and application of the following:

**Table No.4 — Design for and Select Fire Damper Checklist**

| No. | Application | Check |
|---|---|---|
| 1 | the principles and design of compartmentation | |
| 2 | fire resistance periods | |
| 3 | fire safety in buildings, human behaviour and escape requirements, principles of fire chemistry and physics, including ignition and heat transfer. | |
| 4 | the principles and design of ventilation | |
| 5 | fire damper applications and application risks | |
| 6 | fire damper testing and classification | |
| 7 | the interaction between ventilation systems and other systems such as smoke control systems and the use of combined ventilation and smoke control systems | |
| 8 | the ductwork types that are used (e.g. steel/plastic, fire resisting, smoke control) | |
| 9 | wall/floor/shaft constructions | |
| 10 | fire damper installation methods, fire damper support and penetration seals | |
| 11 | fire dampers in combined penetrations | |
| 12 | fire damper to ductwork connections | |
| 13 | the operation, applications, advantages and limitations of different fire damper devices | |
| 14 | the appropriate industry standards and regulations relevant to selecting, installing and testing the devices | |
| 15 | fire strategies, compartmentation requirements and fire penetration seal requirements relevant to the damper | |
| 16 | principles of fire damper control systems | |
| 17 | principles of ductwork and damper cleaning | |
| 18 | the organisational procedures for:<br>• completion of the relevant documentation<br>• the recording of relevant data and information<br>• informing relevant others<br>• addressing issues and problems identified | |
| 19 | behavioural competence, the ethical principles to promote safe outcomes, with respect for life, the law, environment and public good | |
| 20 | The organisational procedures for confirming with the relevant others the appropriate actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum negative impact on the installation work to be undertaken | |

# APPENDIX

# APPENDIX A

## PRINCIPAL REGULATIONS AND GUIDANCE DOCUMENTS


**Regulatory Reform (Fire Safety) Order 2005**

**Legislation**


**Building Safety Act 2022**

**Legislation**


**Fire Safety Act 2021**

**Legislation**


**Approved Document B**

**Guidance**

**HTM– 03:01:2019**

**Specialised Ventilation for Healthcare Premises**

**Standard**


**BS 9999-2017**

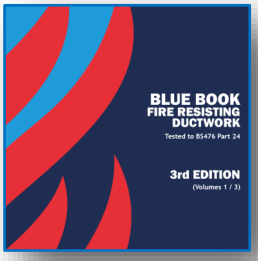
**Fire safety in the design, management and use of buildings**

**Standard**


**ASFP Grey Book**

**EN Fire Dampers**

**Guidance**




**ASFP Blue Book**

**Fire Resisting Ductwork**

**Guidance**


**NAAD 21**

**Part 1: Grease**

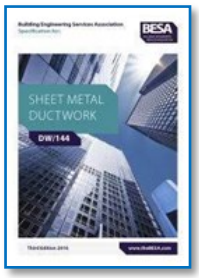
**Part 2: Air**

**Guidance**


**NAAD 22**

**Fire Dampers**

**Guidance**




**DW/144**

**Specification for Sheet Metal Ductwork 2016**

**Guidance**


**DW/145**

**Guide to good practice for the Installation of Fire and Smoke Dampers (June 2010)**

**Guidance**

**The above publications were current when NAAD-22 was published, please check and use latest publications for guidance**

# APPENDIX B

## REFERENCE OF REGULATIONS/STANDARDS/GUIDANCE PERTAINING TO FIRE DAMPERS (FULL LIST)

A brief overview of the regulations, standards and good practices recognised in the UK in relation to fire dampers. A reference list of the various organisations who have produced the documents are catalogued.

| LEGISLATION/ REGULATION | SOURCE | TITLE |
|---|---|---|
| RRFSO 2005 * | Leg Gov | The Regulatory Reform (Fire Safety) Order 2005 1541 PT 2 17 |
| Fire Safety Act 2021 | Leg Gov | Fire Safety Act 2021 |
| Approved Document B (ADB) | Leg Gov | Approved Document B—Volume 2: Buildings other than dwellings<br>2019 edition incorporating 2020 and 2022 amendments – for use in England |
| EN 1366 –2:2015 | bsi | Fire Resistance Tests for Service Installations Part 2 Fire Dampers ISBN 978 0 580 86606 7 |
| EN 1366—10:2022 | bsi | Fire Resistance tests for service Installations—Part 10 Smoke Control Dampers ISBN 978 0 539 06240 3 |
| BS EN 15780: 2011 | bsi | Ventilation for Buildings. Ductwork. Cleanliness of Vent Systems ISBN 978 0 580 74008 4 |
| Approved Document L (ADL). | Leg Gov | Approved Building Document L<br>The Building Regulations 2010<br>Volume 2: Buildings other than dwellings |
| Approved Document B | Leg Gov | Building regulation in England covering fire safety matters within and around buildings |
| Approved Document F | Leg Gov | Building regulation in England for the ventilation requirements to maintain indoor air quality |
| BS EN 12097:2006 | bsi | Ventilation for buildings . Requirements for ductwork components to facilitate maintenance of ductwork systems ISBN 0 580 49528 0 |
| Construction (Design and Management) Regulations 2015 (CDM) | HSE | Managing health and safety in construction Paragraph 112 & Section 163<br>ISBN 9780717666263 |
| L24<br>Regulations 5 & 6<br>(Revised 2013) | HSE | Workplace (Health, Safety and Welfare) Regulations 1992. Approved Code of Practice and guidance.<br>ISBN 9780717665839 |
| Building Regulations 2010 Part J | Leg Gov | Approved document J: Combustion appliances and fuel storage systems ISBN 0 7176 0413 6 |
| Building Safety Act 2022 | Leg Gov | Building Safety Act 2022 |

| STANDARDS | SOURCE | TITLE |
|---|---|---|
| ASFP Grey Book 2nd Edition | ASFP | Grey Book EN Fire Dampers |
| ASFP Blue Book 3rd Edition Vol 1/3 | ASFP | The Blue Book— Fire Resisting Ductwork<br>Parts 1,2 and 3. |
| BS 9999-2017-TC Appendix W | bsi | Fire safety in the design, management and use of buildings. Code of practice ISBN 978 0 580 97716 9 |
| BS 1703:2005 | bsi | Refuse Chutes and hoppers specification ISBN 0 580 47642 1 |
| BS EN 12236:2002 | bsi | Ventilation for buildings. Ductwork hangers, & support. Requirement for strength SBN 0 580 39457 3 |
| FMS 1/97 | BSRIA | Guidance and the standard specification for Ventilation Hygiene. ISBN 9780860224549 |
| HTM 03:01:2019, Scottish SHTM 03-01 A&B Welsh HTM 03A | Dept of Health | Health Technical Memorandum Specialised Ventilation for Healthcare Premises 978011322805 8 Part A Design & validation & Part B Specialised ventilation & performance verification |
| HTM 05-02 | Dept of Health | Fire safety in the design of healthcare premises |
| PAS-8670 BSI Flex 8670 v3.0:2021-04 | bsi | Built environment. Core criteria for building safety in competence frameworks. Code of practice |
| BS EN 520:2004+A1:2009 | bsi | Gypsum plasterboards. Definitions, requirements and test methods. ISBN: 978 0 580 63867 1 |
| BS EN 1363-1:2012 | bsi | Fire Resistance Tests General Requirements (British Standard). ISBN: 978 0 580 98486 0 |
| **GUIDANCE** | **SOURCE** | **TITLE** |
| ADCAS Guide | ADCAS | Guide to Ductwork Cleaning & Access Doors |
| DW/144 | BESA | Specification of Sheet Metal Ductwork ISBN 978-0-903783-64-4 |
| DW/145 | BESA | Guide to good practice for the Installation of Fire and Smoke (June 2010 )Dampers ISBN 978-0-903783-63-7 |
| NAAD-21 | NAADUK | Part 2 AIR (Indoor Air Quality) |
| NAAD-22 | NAADUK | Fire Dampers<br>Secton1 Routine Maintenance, Testing & Inspection<br>Section 2 Installation, Testing & Commissioning<br>Section 3 Design for and Selection of Fire Dampers |
| ASFP Guide | ASFP | On-Site guide to installing fire-stopping |
| TR19 | BESA | Guide to Good Practice Internal Cleanliness of Ventilation Systems ISBN 978-0-903783-65-1 |
| Guide A Environmental design | CIBSE | Guide A Environmental design (2015, updated 2021) ISBN 9781906846541 |
| HEVAC 6/5/83 rev 2 March 2012 | HEVAC | Installation frame for fire dampers complying with the requirements of the Greater London Council |

# APPENDIX C

## ACRONYMS OF VENTILATION COMPONENTS & CLAUSES

| ACRONYM | COMPONENTS & CLAUSES |
|---|---|
| (I) | Insulated Fire Damper |
| CDP | Contractors Design Portion |
| DIAP | Direct Field of Application |
| DoP | Declaration of Performance |
| E Classification | Fire resistance integrity of the damper |
| ES Classification | Reduced Smoke Leakage Fire Damper |
| EXAP | Extended Field of Application |
| FD | Fire Damper |
| FSD | Fire and Smoke Damper |
| IOM | Installation, Operation, and Maintenance |
| MFD | Motorised Fire Damper |
| MFSD | Motorised Fire & Smoke Damper |
| MSAD | Motorised Smoke Damper |
| MSCD | Motorised Smoke Control Damper |
| MSFD | Motorised Smoke & Fire Damper |
| S Classification | Low Smoke Leakage rating of the damper |
| SCD | Smoke Control Damper |
| SD | Smoke Damper |

# APPENDIX D

## ACRONYMS OF ORGANISATIONS

| ACRONYM | ORGANISATION |
|---|---|
| ADCAS | Association of Ductwork Contractors & Allied Services |
| ASFP | Association for Specialist Fire Protection |
| BAFA | British Approvals of Fire Equipment |
| BESA | Building Engineering Services Association |
| BRE | Building Research Establishment |
| BSI | British Standards Institute |
| BSRIA | Building Services Research |
| CEDA | Catering Equipment Distributors Association |
| CIBSE | Chartered Institute of Building Services Engineers |
| CITB | Construction Industry Training Board |
| FETA | Federation of Environmental Trade Associations |
| FPA | Fire Protection Association |
| HEVAC | Association for manufacturers and suppliers of HEVAC |
| HSE | Health and Safety Executive |
| IHEEM | Institute of Healthcare Engineering and Estate Management |
| IWFM | Institute of Workplace and Facilities Management |
| LPCB | Loss Prevention Council Board |
| NAADUK | National Association of Air Duct Specialists UK |
| NADCA | National Air Duct Cleaners Association (USA) |
| NVQ | National Vocational Qualification |
| RISC Authority | Research for FPA |
| ROSPA | The Royal Society for the Prevention of Accidents |
| SAGE | Scientific Advisory Group for Emergencies |
| SCQF | Scottish Credit & Qualifications Framework |
| SVQ | Scottish Vocational Qualification |
| WHO | World Health Organization |

# APPENDIX E

## ASFP ON-SITE GUIDE TO INSTALLING FIRE-STOPPING

The **ASFP On-site guide to installing fire stopping** is recognised by **NAADUK** as the primary reference document for Fire Compartmentation. It is recommended that the full document is read through completely. This is not a comprehensive guide to firestopping fire dampers. It is to be used be those inspecting or installing to check any other fire stopping in the wall or floor compartmentation.

## Extract from **ASFP On-Site guide to installing fire stopping** with Permission

In this guide 'fire-stopping' includes cavity barriers, penetration seals for services and linear joint seals. The guidance given below is general best practice; however some manufactures' products may be able to cope with some situations better than other. Remember the manufacturer's information/instructions always take precedence.

**Who can install fire-stopping?**

Ideally, fire-stopping should only be carried out by 'competent persons' i.e. those working for a third party certificated contractor or those who have had their competency checked by a scheme run by a third-party certification body. This is recommended in the Building Regulations in the UK and Ireland.

If you are not a 'competent person' the Association for Specialist Fire Protection (ASFP) recommends you join an appropriate scheme as this will demonstrate your expertise and assist in reducing any liability. If fir-stopping is only an ancillary function to your main profession e.g. plumber, electrician, dry-line, then an acceptable alternative is to achieve an NVQ Level 2 qualification I fire-stopping. Details on how to join third party scheme and how to get an appropriate NVQ ar contained within this document.

1. Health & Safety

Ensure that all works are planed and undertaken in line with current health & safety legislation, observing specific site conditions and any manufacturers' literature. This includes being in compliance with the principal contactor's health and safety work plan.

2. Site conditions

- Confirm the environment is right for installing fire-stopping (temperature, humidity). Check if thee ae any chemicals present that might affect fire-stopping materials and the substrates are clean and dust free.
- Do not use the penetration seal area and space around a duct or damper assembly for the passage of other building services as their presence may invalidate the tested penetration seal method.
- All penetrating services should be supported either side of the wall by fire tested supports to prevent collapse of the seal in a fire. The distance to the first support is particularly important. Check the manufacture's information and ASFP Advisory Note 8. In the absence of any information, the first support should be more than 300mm from the face of the seal.
- If the service is already installed (supports have already been fitted) ensure that the fire-stopping is installed with the supports at the correct distance from the faces of the seal.
- Dampers must be independently supported so that when activated they do not affect the stability of the surrounding fire-stop unless it is designed to support them and has been tested in the fire damper test EN 1366-2. This should be clarified with the damper manufacturer.
- Fire damprs should be situated within the thickness of the fire separating element and be securely fixed. It is also necessary to ensure that, in a fire, expansion of the ductwork does not push the fire damper through the structure. In all cases, check with the fire damper manufacture's EN 1366-2 fire tested installation methods.

3. Pre-installation checks

Ensure that the fire-stopping system you are installing is correct.

- Check the fire resistance time provided by the seal. Are you trying to protect a 60 minute wall with a 30 minute seal? Refer to the manufacturer's information and site drawings.
- Is the seal suitable for the type and size of penetrating service and the size and orientation of the service being sealed? Is the seal too small or too large for the penetrating pipe? Are you using a system designed for walls in a floor?
- Is the wall or floor the seal is to be installed in constructed correctly? Is the aperture suitable e.g. correct size and in good condition? A full check on the surrounding construction may not be possible, but if you have some doubts, you should raise them with the main contactor.

4. General dos and don'ts

Dos

- Do check the product's fire test and other evidence to ensure it adequately supports the end use application being used e.g. products tested only as linear gap seals should not be used in a penetration seal application. See ASFP Advisory Note: *Using polyurethane foams.*
- Do use a loadbearing fire seal for all floor penetrations where there is ANY risk of any person standing on it. ASFP Advisory Note 1 provides further details. Some motor systems will require steel reinforcement over certain spans; it is important to understand the specific limitations of the system you are using.
- Do ensure that where penetration seals are to be installed around fire dampers or ducts, that the seal used is approved for use and is compatible with the damper/duct in question.
- Do use a tested system when installing a flexible cavity barrier which requires services to pass through it. Many penetration sealing systems used for masonry and partition walls cannot be used with large cavity barriers unless proven by test.

Don'ts

- Don't mix one manufacturer's product with another's in a single seal e.g. batts and mastics from different manufacturers or pipe collars and batts from different manufacturers. This is not proven by test evidence and therefore cannot be assumed to work. Consult the manufacturer's literature and ASFP Advisory Note 6 **Use of fire-stopping components from different manufacturers/systems.**
- Don't omit 'framing out' unless test or assessment evidence from the manufacturer of the seal or the partition shows it is not required. Partition manufacturers' literature often states that when installing penetrations the hole must be generally be framed within the stud work and then lined with theappropriate board (framing out).
- Don't install intumescent wraps or collars in non-loadbearing barriers such a coated stone wall (batt and mastic systems) unless proven by a fire test or assessment.
- Don't use batt and mastic systems in floors where there may be a requirement to support foot traffic without separate mechanical protection e.g. a stell grid fixed above the seal.

5. Workmanship dos and don'ts

Dos

- Do use the manufacturers' recommended coating/mastic for 'buttering' batt to batt, batt to wall and batt to penetration joints.
- Do use the correct number of pours for mortars as sometimes it is required for the effective depth of mortar to be applied in only one or two pours. Consult manufacturer's instructions.
- Do install pipe wraps within the fire-stop mortar such as that they finish flush with the seal soffit.
- Do check and if required carry out repairs to any damaged/defective fire-stopping or penetration seal using manufacturer approved methods. If you have installed the seal you can repair it. If others have installed it and it is damaged and you don't know what it is; it should be removed and replaced.
- Do ensure that no glass wool or combustible materials have been sued around penetrations and in joints unless they have been successfully tested for the particular application.
- Do ensure compartment walls have been taken up to the underside of compartment floors (above suspended ceilings) and that a suitable deflection head is fitted if the wall is non-load bearing.
- Do ensure that fire-stopping reaches the edge of floor slabs e.g. for curtain walling: see ASFP Advisory Note 7.
- Do ensure all possible routes for smoke, gases and flame have been sealed. This is the main reason for installing fire-stopping.

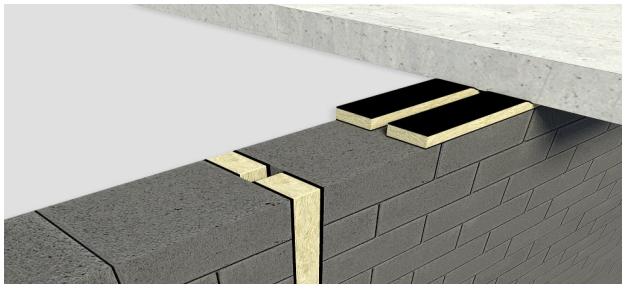
Don'ts

- Don't leave stone wool packed around services without any fire-stopping material covering it.
- Don't use plastic plugs for installing supports or collars as these may melt in a fire and fall out.

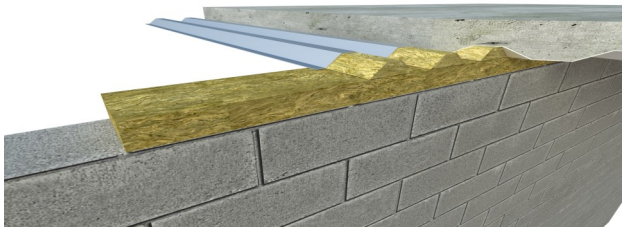
Illustration and explanation of different scenarios taken from the

**ASFP On-site guide to installing fire-stopping**

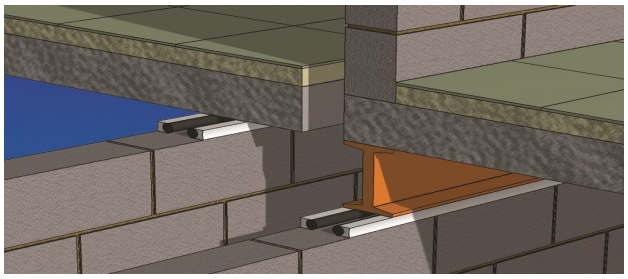
### WALLS & FLOORS—HEAD OF WALL



⇒ If movement is expected an appropriate system that can accommodate movement should be used.

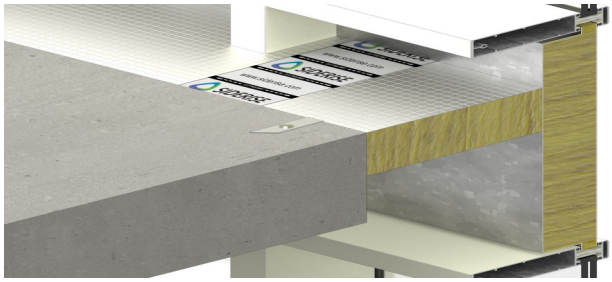


⇒ Ensure there are no gaps e.g. in profiled decks.



⇒ If services penetrate the head of the wall joint they need to be sealed with an appropriate fire-stopping material or product.

### WALLS & FLOORS—WALL/FLOOR JOINT



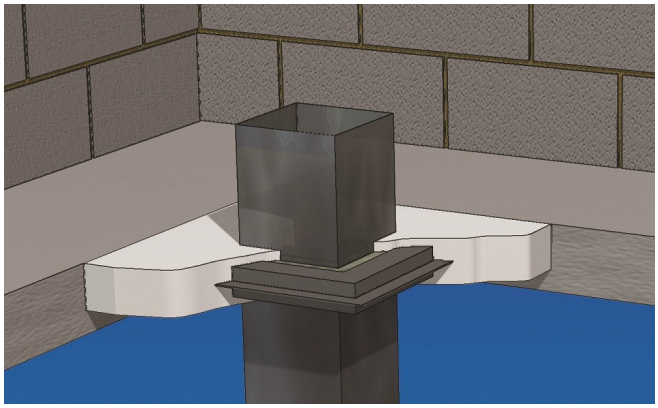
⇒ If movement is expected, an appropriate system that can accommodate movement should be used.

⇒ Façade movement must be accommodated by a flexible seal that must be adhered or mechanically fixed to the slab according to the manufacturers guidelines.

## WALLS & FLOORS—RISERS

⇒ It is strongly advised that floor openings for service shafts should be sealed with a loadbearing fire seal.

⇒ Plastic pipes must have pipe collars fired to the underside of the floor or incorporated into the seal if shown by test.

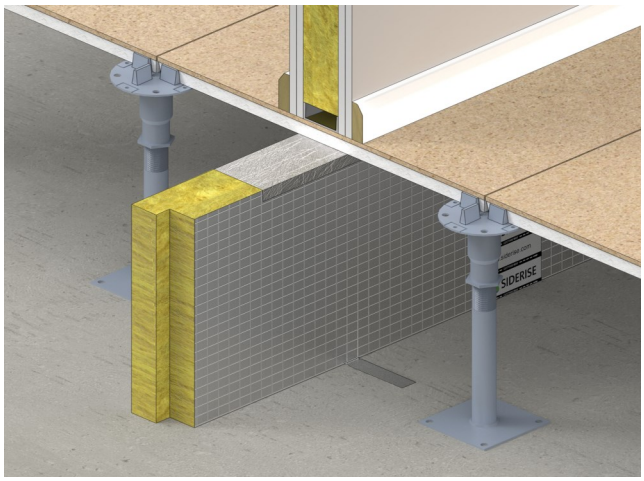


⇒ Any plastic/rubber in the firestop must not degrade the plastic pipe by plasticiser migration.

⇒ The fire-stop should allow the pipe to move in the penetration to allow for expansion and contraction whilst maintaining a smoke seal during its normal service life.

⇒ Insulated pipes may be sealed with a pressure exerting intumescent product or intumescent sleeve to cope with shrinking insulation, or sleeved with fire-rated insulation.

## WALLS & FLOORS—ACESS FLOORING




⇒ Ensure that adequate fire barriers are in place beneath compartment walls and fire doors and at 20m maximum centres for cavity barriers.

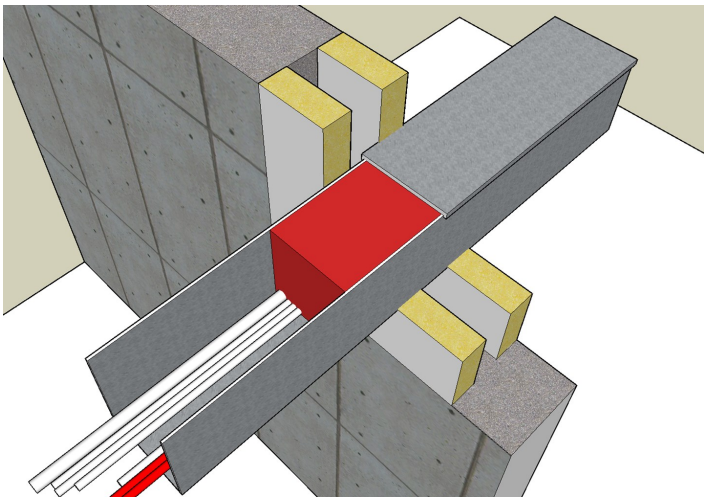
⇒ Ensure that stone wool barriers are adequately supported and in line with fire rated partitions where applicable.

## CABLE TRAYS & BASKETS

⇒ Any fire seal has to have been tested for the range of cable types on site (e.g. armoured, computer etc.) and the range of diameters used.

⇒ If further cables are to be added in the future, then any fire stopping may be removable or modifiable.

## CABLE TRUNK

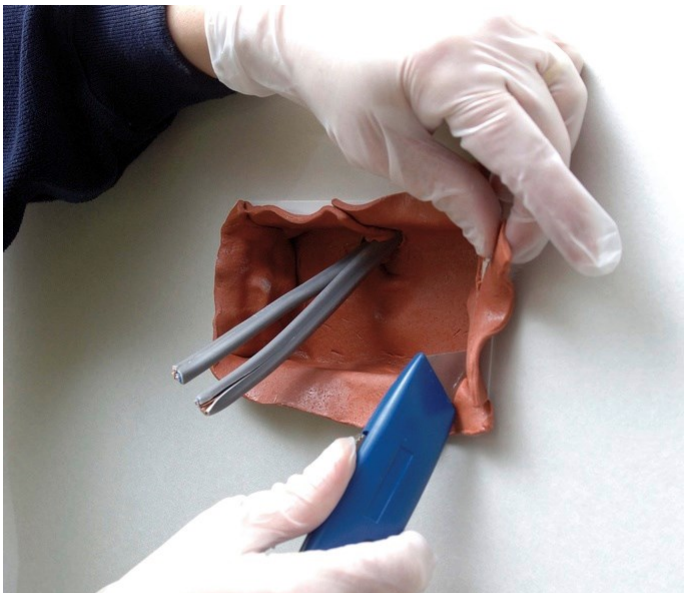


⇒ The inside of any trunking must be fire-stopped at the location where the penetration passes through the barrier.

⇒ A short length of trunking lid, protruding a short distance each side of the seal, should be secured in position in line with the separating element, prior to installation of the penetration sealing system.

⇒ The periphery of the trunking should be fire-stopped appropriately.

## ELECTRICAL SOCKETS



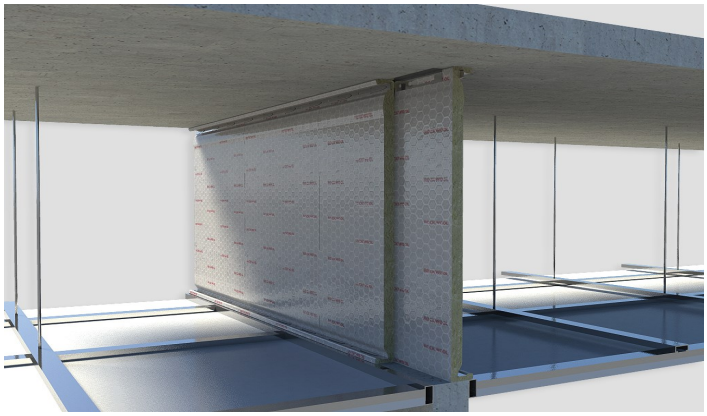
⇒ When electrical outlets (back-boxes) are fitted into partition stud walls they must be fire-stopped to prevent fire penetration through the plasterboard and into the cavity using an intumescent based pad.

## SERVICE SUPPORTS—FIXINGS

⇒ The first supports for the penetrating service should be as close as possible to the seal face; and in the absence of any contrary specification position not more than 300mm away.

⇒ The first supports for the penetrating service should use fire rated anchors, supports and other brackets able to carry the service load for the period of fire resistance.

## SERVICE SUPPORTS—FIRE CURTAINS & CAVITY BARRIERS



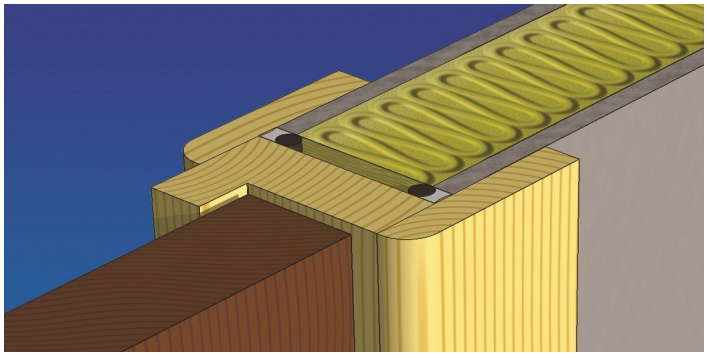
⇒ Ensure that curtains are anchored to the soffit and according to manufacturer's instructions. Cavity barriers are generally not secured at their lower edge.

⇒ Ensure that curtains are correctly wired/stitched or stapled together depending on the type of curtain used.

⇒ Ensure that service penetrations are sleeved and that sleeves are wire stitched / stapled / glued to the curtain according to manufacturer's instructions.

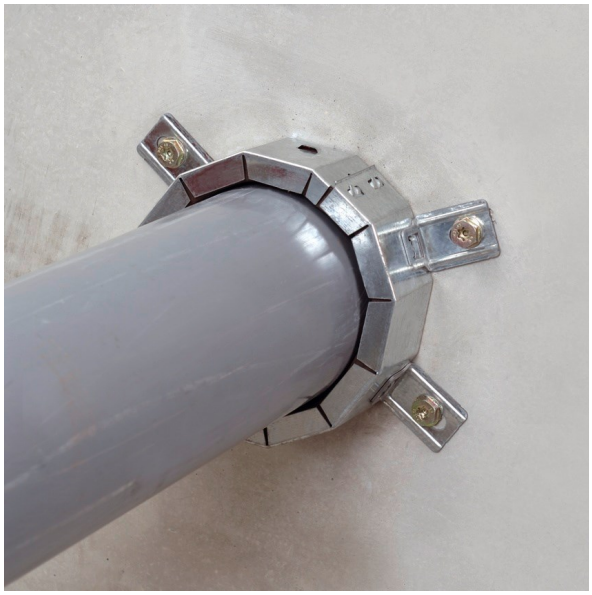
⇒ If penetrating services pass through the fire curtain ensure that there is adequate fire test evidence to demonstrate that this is acceptable.

## FIRE DOOR FRAMES



⇒ Gaps between frame and wall must be fire-stopped to the same rating as the door or as per BS 8214 using a suitable fire-stopping produce.

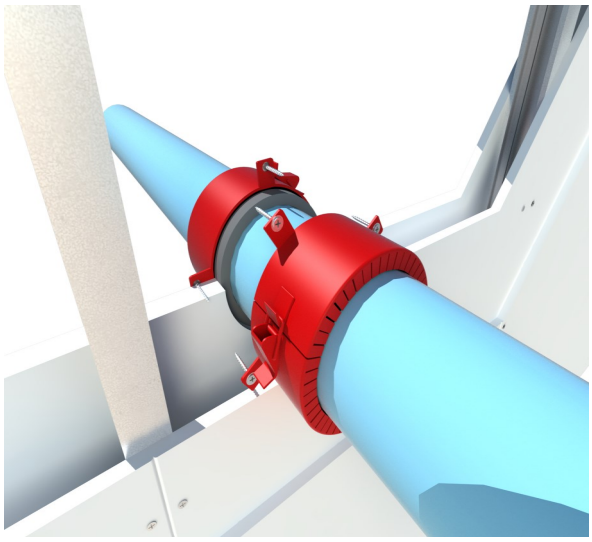
## PLASTIC PIPES



⇒ Wall penetrations must have a closing device such as a high pressure exerting intumescent sealant, pip wrap or pipe collar.

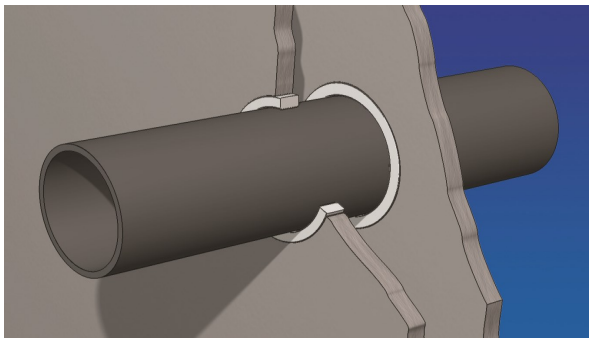
⇒ Any plastic or rubber in the firestop must not degrade the plastic pipe by plasticiser migration.

⇒ The fire-stop should allow the pipe to move in the penetration to allow for expansion and contraction whilst maintaining a smoke seal during its normal service life.

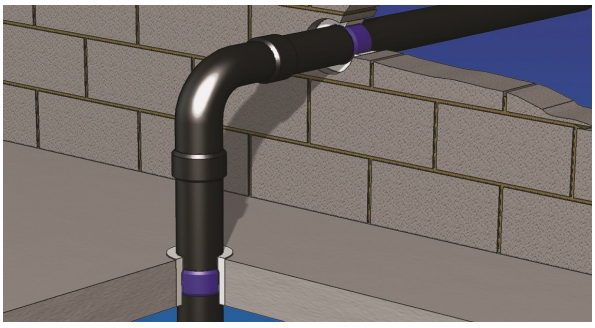


⇒ Soil pipes must have a closing device installed; if it is a collar it must be mechanically fixed to the soffit unless the manufacturer's test data supports another fixing method. Alternative products may be used provided they have been tested.

⇒ All collars must be mechanically fixed firmly against the compartment element face, unless the manufacturer's test data supports another fixing method.



⇒ All collars must be secured to the element with fire-rated anchors (no wood screws and plugs nor zinc-based anchors) using all fixing brackets.



⇒ Pipe wraps must be backfilled with mortar compound to the recommended depth.

⇒ Pipe wraps and collars must be suitable for pipe material (PVC, PE, PP, ABP etc.)

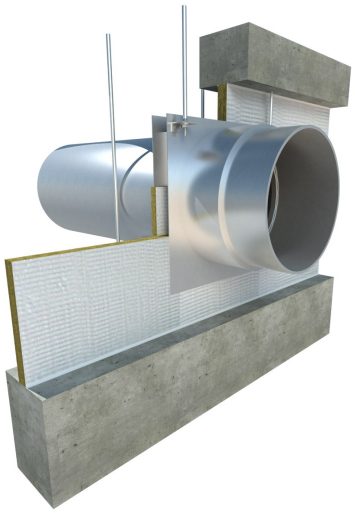
## METAL PIPES

⇒ If cement has been used it must be reinforced to prevent cracking in fire and be present for the full depth of the wall or floor.

⇒ Insulated pipes may be sealed with a pressure exerting intumescent sealant or intumescent sleeve to cope with shrinking insulation, or sleeved with fire rated insulation.

⇒ A piper of lead, aluminium, aluminium alloy, fibre-cement or PVCu, with a maximum nominal internal diameter of 160mm may be used with a sleeve of non-combustible pipe (1m each side of the wall), fitted with no annulus to the pipe. Fire-stopping should be provided between the sleeve and the structure.

## FIRE DAMPERS



⇒ Fire dampers should be situated within the thickness of the fire separating element and be securely fixed. It is also necessary to ensure that, in a fire, expansion of the ductwork would not push the fire damper through the structure. In all cases, check with the fire damper manufacturer's EN1366-2 fire tested installation methods.

⇒ Fire dampers can only be installed with the penetration seal used in the test of the fire damper to EN 1366-2.

⇒ Fire-stops for solid walls and floors are usually fire resisting mortar compounds.

⇒ Partition walls must have openings framed with metal studding and plasterboard before fitting of a damper unless test evidence to EN 1366-1 supports the use of an unframed opening.

**NAADUK would like to thank ASFP for permission to publish segments of this document**

# APPENDIX F

## DIFFERENT GUIDANCE DOCUMENTS FOR RELEVANT BUILDING TYPES

| VENTILATION FOR BUILDINGS OTHER THAN OFFICES | |
|---|---|
| **BUILDING/SPACE/ ACTIVITY** | **REGULATIONS AND GUIDANCE** |
| Animal husbandry | The Welfare of Farm Animals (England) Regulations SI 2000 No. 1870 London:<br>The Stationery Office 2000.<br>The Welfare of Farm Animals (England) (Amendment) Regulations SI 2002No.1646<br>The Welfare of Farm Animals (England) (Amendment) Regulations SI 2003 No.299<br>BS 5502:2003+A1:2013 *Buildings and Structures for Agriculture*<br>See also CIBSE Guide B:2005, Section 2.3.24.1, and CIBSE AM10:2005 if naturally ventilated |
| Assembly halls | CIBSE guide B:2005, Section 2.3.3<br>CIBSE AM10 :2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Atria | CIBSE Guide B:2005, Section 2.3.4<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Broadcasting studios | CIBSE Guide B:2005, Section 2.3.5 |
| Building services plant rooms | Provision for emergency ventilation to control dispersal of contaminating gas releases (e.g. refrigerant leak) is given to paragraphs 23 to 25 of HSE Guidance Note 202 *General Ventilation in the Workplace – Guidance for Employers. Other guidance is in BS 4434:1989 Specification for safety aspects in the design, construction and installation of refrigeration and appliances and systems* |
| Call centers | CIBSE guide B :2005, Section 2.3.24.2<br>CIBSE AM10 :2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Catering (inc. commercial kitchens) | HSE Catering Information Sheet No. 10, 2000: *Ventilation of kitchens in catering establishments*<br>HSE Information Sheet No.11, 2000: *The main health and safety law applicable to catering*<br>See also CIBSE Guide B:2005, Section 2.3.6, and HVCA DW/172 *Specification for Kitchen Ventilation Systems*<br>EC 852:2004 FSA |
| Clean rooms | CIBSE Guide B:2005, Section 2.3.7 |
| Common spaces | The following provisions apply to **common spaces** where large numbers of people are expected to gather, such as shopping malls and foyers. They do not apply to **common spaces** used solely or principally for circulation<br>**Either:**<br>a. natural ventilation by appropriately located **ventilation opening (s)** with a total opening area of at least 1/50$^{th}$ of the floor area of the **common space**;<br>**or**<br>b. mechanical ventilation installed to provide a supply of fresh air 1 litre per section per m$^2$ of floor area |

| BUILDING/SPACE/ ACTIVITY | REGULATIONS AND GUIDANCE |
|---|---|
| Communal residential buildings | ES Energy Efficiency Best Practice in Housing, Good Practice Guide GPG 192: *Designing energy efficient multi-residential buildings*<br>See also CIBSE Guide B:2005, Section 2.3.8, and CIBSE AM10:2005 if naturally ventilated or CIBSE AM13:2000 if mixed mode |
| Computer rooms | CIBSE Guide B 2005, Section 2.3.9<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Darkrooms (photographic) | CIBSE Guide B:2005, Section 2.3.24.4 |
| Dealing rooms | CIBSE Guide B 2005, Section 2.3.24.5<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Factories and warehouses | Factories Act<br>Health and Safety at Work etc. Act<br>See also CIBSE Guide B:2005, Section 2.3.11, and CIBSE AM10:2005 if naturally ventilated or CIBSE AM13:2000 if mixed mode. Requirements are often exceeded by other criteria such as the ventilation requirements of the particular manufacturing process |
| High-rise (non-domestic buildings) | CIBSE Guide B:2005, Section 2.3.12, and CIBSE AM10:2005 if naturally ventilated or CIBSE AM13:2000 if mixed mode |
| Horticulture | CIBSE Guide B:2005, Section 2.3.24.6<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Hospitals and healthcare buildings | NHS Activity database<br>Health Technical Memorandum (HTM) 03<br>Health Building Notes (HBC) – various<br>CIBSE Guide B:2005, Section 2.3.13, and CIBSE AM10:2005 if naturally ventilated or CIBSE AM13:2000 if mixed mode |
| Hotels | CIBSE Guide B:2005, Section 2.3.24.6<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Industrial ventilation | *Industrial ventilation*, 24th Edition, *Manual of recommended practice*, American Conference of Government Industrial Hygienists<br>HS(G) 37 *An introduction to local exhaust ventilation*<br>HS(G) 54 *Maintenance, examination and testing of local exhaust ventilation*<br>HS(G) 193 *COSHH essentials* |
| Laboratories | CIBSE Guide B:2005, Section 2.3.16 |
| Museum, libraries and art galleries | BS 5454:2000<br>CIBSE Guide B:2005, Section 2.3.24.6<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Plant rooms | CIBSE Guide B:2005, Section 2.3.18 |
| Prison cells | Refer to National Offender Management Service (NOMS). Home Office, NOMS Property, Technical Services, Room 401, Abell House, John Islip St., London, SW1P 4LH |

| BUILDING/SPACE/ACTIVITY | REGULATIONS AND GUIDANCE |
|---|---|
| Sanitary accommodation | Same as for offices in Table 2.1a |
| Schools and educational buildings | Ventilation provisions in schools can be made to comply with the guidance in Building Bulletin 101, *Ventilation of School Buildings* and in the Education (School Premises) Regulations.<br>Building Bulletin 101 can also be used as a guide to the ventilation required in other educational buildings, such as further educational establishments, where the accommodation is similar to that in schools e.g. sixth form accommodation . However, the standards may not be appropriate for particular areas where more hazardous activities take place than are normally found in schools, e.g. some practical and vocational activities that require containment or fume extraction.<br>Building Bulletin 101 can also be used for children's centers and other early years settings, including day nurseries, playgroups etc. |
| Shops and retail premises | CIBSE Guide B:2005, Section 2.3.24.6<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |
| Sports centers (inc. swimming pools) | Sport England – Sports Halls Design and Layouts: Updated and combined guidance (2012)<br>CIBSE Guide B:2005, Section 2.3.21 |
| Standard rooms | CIBSE Guide B:2005, Section 2.3.24.7 |
| Transportation buildings and facilities | CIBSE Guide B:2005, Section 2.3.24.6<br>CIBSE AM10:2005 if naturally ventilated<br>CIBSE AM13:2000 if mixed mode |

# APPENDIX G

# NATIONAL OCCUPATIONAL STANDARDS

## What is National Occupational Standards (NOS)?

NOS, also known as professional standards, are developed through extensive consultation with industry experts, employers and professional bodies to ensure they accurately reflect the requirements of specific job roles. NOS in the UK are a set of benchmarks that clearly define the skills, knowledge and understanding required for competent performance in a particular occupation or profession. NOS specify UK standards and outline the key tasks, activities and competences that individuals need to demonstrate to carry out their roles efficiently, they also specify the underpinning knowledge and understanding required to support competent practice.

These standards are designed to promote consistency, quality and excellence in the workplace by establishing a baseline of expected performance. NOS play a vital role in various aspects of workforce development and regulation, they formed the foundation for designing vocational qualifications, apprenticeship frameworks and training programmes. NOS provide a clear and consistent framework for assessing and recognising the capabilities of individuals working in various industries and sectors. They provide a common language for employer's, employees and training providers to communicate about the required skills and competencies within a specific occupation.

Professional bodies and sector skills councils in the UK often oversee the development and maintenance of NOS. They ensure that the standards remain up to date reflecting the evolving needs and practises within each industry.

## How to access the NOS Database?

The NOS Finder Database ( https://www.ukstandards.org.uk/en ) will always show the most current NOS with the database being updated as they replace the previous versions. Older NOS are either removed completely or marked as ''Legacy''. Legacy means that the NOS may still be used in qualifications and so is still required. These can be identified by having the word Legacy at the end of the title and have the letter L at the end of the URN.

## How are NOS used to develop qualifications or training interventions?

NOS themselves are not intended as a vocational curriculum but are used to influence the content and development of qualifications and training courses. They can be used directly in qualifications such as Scottish/National Vocational Qualifications and one NOS correlates directly to one unit in these qualifications. They can also be used to influence qualifications and other standards by setting out the skills and knowledge that are required to be met. To become a qualification it must be approved and offered by an Awarding Organisation. NOS do not assess competency, nor do they dictate how training should be delivered or assessed, that process is for Awarding Organisations and delivery agents to determine.

## NOS & Fire Damper Qualifications

NOS are important in the context of fire dampers and smoke control damper training for several reasons. NOS provide a consistent and clear framework for defining the skills, knowledge, and behaviours required to perform a specific job or task. For example, the NOS for fire damper and smoke control damper technicians outline the competencies required to install, commission and test and maintain these critical safety systems. NOS can be used to design effective training programs or qualifications by identifying the specific competencies required for a particular role. NOS provide a roadmap for designing training programs that target those competencies utilising a benchmark against which an individual's performance can assessed.

The NOS Unit Numbers for fire dampers are below:

**BSEFSD01** – Install and test Fire Dampers and Smoke Control Dampers

**BSEFSD02** – Inspect-and-Commission Fire Dampers and Smoke Control Dampers

**BSEFSD03** – Inspect, identify and rectify faults in Fire Dampers and Smoke Control Dampers

**BSEFSD04** – Inspect and maintain Fire Dampers and Smoke Control Dampers

**BSEFSD05** – Apply the design process to select Dampers for ventilation systems and smoke control applications

NOS are crucial in the context of fire dampers and smoke control damper training. In turn, this helps employers establish a standardised approach to training, supporting career development, progression, and improving the quality of work while ensuring compliance.

## Delivering Stand Alone Units.

NOS can be delivered as standalone units in line with fire damper and smoke control damper courses to ensure that participants receive a comprehensive and targeted training experience. Delivering NOS as standalone units allows for a more flexible and modular approach to training, as participants can complete individual units over a period of time, rather than having to complete an entire qualification/ course in one go. For example, a technician who specialises in the installation of fire dampers may choose to focus on the NOS units related to installation techniques and standards, while a technician who specialises in the maintenance of smoke control dampers may choose to focus on the NOS units related to testing and inspection procedures.

This can be particularly beneficial for participants who have limited time or those who are unable to commit to a full-time training programme. Delivering NOS standalone units allows for greater customisation of training programmes to meet the specific needs of individual organisations. For example, an organisation may choose to focus on specific NOS units that are most relevant to their particular industry or work environment, which can help to ensure that the training is tailored to their specific need or to enrol for revalidation purposes.

## Summary

Any training that concerns fire dampers must be conducted by a third-party training provider who hold a relevant certified qualification that is relevant to the environment of the building. The recognised third-party certifications are CITB, SQA and Ofqual.

**Awareness courses do not give the person the knowledge or competence to allow an individual to complete the work but may contribute towards a NOS.**

# APPENDIX H

## REFERENCE OF TABLES

# CONTRIBUTIONS AND THANKS


- **To all the Fire Damper Working Group members who spent their time and expertise in producing this guidance document**

- **ASFP for permission on the use of On-site guide to installing fire-stopping**

- Peter Reid— NAADUK President
- Andy Stanford – NAADUK Chairman &
- Jonathan Brennan— NAADUK Chairman Emeritus
- Nygel Humphrey— BSB— Chairman Fire Damper Working Group
- John Cousins— NAADUK Technical and Auditing
- Sue Sharp— Director  Overclean and NAADUK Executive
- Paul White— Ventilation Fire and Smoke
- James Acott— Fire Investigations UK
- Joshua Jackson— NAADUK
- Andrew Bartlett— Managing Director—Belimo Automation UK Ltd
- Kevin Horan — NAADUK Training Academy
- Paul McSoley – Mace
- Matt Green MEng CEng MIChemE (EUR ING)
- Darren Webster— Technical Manager— FIRESAFE Fire Rated Ductwork & ADCAS
- Niall Rowan— Technical & Regulatory Affairs— Association for Specialist Fire Protection

In addition to the named individuals listed above. We would also like to thank all of our members who regularly attend our growing meetings who have also given ongoing support to our association throughout the creation of this document.

**Images have been supplied by a number of organisations and thanks go to:**

Chris Pagan (Unsplash) — Fig No. 18

Patrick Federi (Unsplash) —Fig No.19

**National Association of Air Duct Specialists UK**

Registered Office:-

12a Flightway,

Dunkeswell,

Honiton,

Devon,

EX14 4RD

Tel: 01404 891539

www.naaduk.co.uk



**Price: FOC**

**Email: admin@naaduk.co.uk**