



 **ductmann**
part of the Lindab Group

Lindab Thor Duct® Fire Rated Ductwork



Ductmann Ltd are a `Supply only` Licensed manufacturers of LindabThor Duct ® for both EN and BS fire and Smoke extract ductwork systems.

WHAT IS THORDUCT®?

Lindab Thor Duct ® is the consequence of 16 years' dedicated of research and development of a team of professionals who are dedicated to saving lives. The vision is for every building to be safe, and every ventilation system to mitigate the risks associated with fire. They constantly refine their products, to ensure that our ventilation ducts meet the fire codes, and always perform when called upon in an emergency.

Lindab Thor Duct ® has been tested to the latest EN standards and as required by law, provides CE marking on products where a harmonised standard exists.

Lindab Thor Duct ® is a complete fire ductwork system, that has been tested to the latest EN standards. It provides CE marking on products where a harmonised standard exists. Lindab Thor Duct ® is suitable for:

SMOKE EXTRACTION ■ PRESSURISATION ■ PASSIVE SCENARIOS
KITCHEN EXTRACTION ■ COMPARTMENTATION

Lindab Thor Duct ® is manufactured from Galvanised Steel, and uses flanges and stiffeners, without paints or coatings. Lindab Thor Duct ® is insulated using a calcium magnesium silicate blanket. (Fyrewrap 1.5 insulation must be used to comply with Thorduct products). Both the product and the insulation have been tested as a system in accordance with test standards which includes access doors, silencers and bracketry.

WHAT CAN DUCTMANN LTD OFFER AS A LICENSEE?

As an licensed Lindab Thor Duct ® Manufacturer Ductmann Ltd are able to manufacture a wider range of "Supply only" fire and Smoke rated ductwork systems within both rectangular and circular products to the following standards below :-



- E-Integrity only and EI-integrity and insulation (eg E120 is 120 minutes integrity only)
- EN1366 -1 Kitchen Extract Ductwork (E120 and EI30/60)
- EN1366-1 Fire Rated Ductwork (E120 and EI60/90/120)
- EN1366-8 Multi Compartment Smoke Extract (CE Marked) (EI60/90) as picture duct wrapped using Fyrewrap 1.5
- EN1366-9 Single Compartment Smoke Extract (CE Marked)
- British Standards BS476:24 Specification

MANUFACTURING OVER 1500 TONNES OF DUCTWORK PER ANNUM

Ductmann Ltd`s manufacturing site is based One mile from Junction 10 of the M6 and are ideally located to service the whole of the UK.

We manufacture over 1500 tonnes per annum of Ductwork and bespoke fabrication, are able to offer quick turnaround lead times, and with our modern production unit we are equipped with the latest production machinery available, operated by a highly trained production staff.



Understanding the new EN regulations

Lindab Thor Duct® is a fire rated ductwork, the result of 16 years of research and development, produced in an **ISO9001** quality control management environment.

Throughout the **CEN** member nations, national standards have been superseded as of July 2013 and have been replaced by the new European Standard for Smoke Extract, namely **EN 12101-7**. For fire ductwork, kitchen extract and pressurisation the test standard is **EN 1366-1** since April 2015, and classification standard **EN 13501-3**.

Lindab Thor Duct® have tested all products to the latest EN standards and as required by law provide CE marking on products where a harmonised standard exists.



Product standard	Classification standard	Test standard	Extended field of application standard
<p>EN 12101-7 Smoke and heat control duct systems.</p>	<p>EN 13501-4 Fire classification of construction products and building elements - part 4: classification using data from fire resistance tests on components of smoke control systems.</p>	<p>EN 1366-8 Fire resistance tests for service installations: Smoke extraction ducts (multi compartment).</p> <p>EN 1366-9 Fire resistance test for service installations: Single compartment smoke extraction ducts.</p>	<p>pr EN 15882-8 Extended applications of test results for Smoke extraction ducts.</p>
<p>pr EN 15871 Fire resisting ducts.</p>	<p>EN 13501-3 Fire classification of construction products and building elements - part 3: classification using data from fire resistance tests on components of normal building service installations.</p>	<p>EN 1366-1 Fire resistance tests for service installations: Ducts.</p>	<p>EN 15882-1 Extended applications of test results for installations: Ducts.</p>

Thor Duct are classified according to **EN 13501-3** and **EN 13501-4**. Classification reports are only valid when the components and manufacturing methods are in accordance with the test evidence. Evidence of an FPC (Factory Production Control) by a notified body is an

important consideration. All Thor Duct manufacturing sites have an FPC in place. The maximum classified smoke control ducts are 1250 x 1000, 1000 Ø. The maximum classified fire resisting ducts are 2500 x 1250, 1250 Ø.

Penetration seals

Penetration seals are one of the areas of great concern. They prevent fire spreading from one compartment to another. Special attention is given to their performance during the tests, and they are documented in the guidelines for installation.

Lindab Thor Duct®'s uniquely built penetration seals withstand severe fire conditions and can be easily installed from components locally available.

Lindab Thor Duct®'s penetration seals are tested in flexible walls, allowing them to be used in stud partitions, block walls and concrete floors.

Thor Duct has been tested under **EN 1366-3** Fire resistance tests for service installations, penetration seals. A unique test was completed with 17 other services in a single ope, achieving 132 minutes.



Access doors (T30 - T76)



Standard access doors offer no fire resistance whatsoever. The **Lindab Thor Duct**® Fire Door range has been tested at full furnace temperatures.

The UK and Ireland guidance document **DW172** states that all interior surfaces of the ductwork shall be **accessible for cleaning** and inspection purposes. In the absence of a detailed cleaning program, it is recommended that **access doors are installed every 2 meters**.

Thor Duct access doors are tested to EN 1366-1 and EN 1366-8, classified EN 13501-3 and EN 13501-4

EI 120 V_e H_o (I ↔ o)

Lindab Thor Duct® ducting is designed with specific emphasis on strength with a minimum load bearing rate per square meter because of its uniquely built structure.

Lindab Thor Duct®'s EN range is unique in having one of the lowest kg weight per square meter.

Fixing & supports

Prescribed fixing and supports are an integral part of the system and have been tested under full fire conditions.

It is important that the system is installed as tested.

Insulation - Fyrewrap Elite 1.5

Fire rated insulation ensures that the temperature measured (outside in Type A, and inside in Type B) does not exceed 140°C mean average above ambient during the test and is deemed automatically failed if any thermocouple rises to 180°C.

Lindab Thor Duct® insulation is a compact calcium-magnesium silicate blanket made from low bio-persistence wool with a thickness of 38mm.

It is totally inorganic and exonerated from classification under Nota Q of EU Directive 97/69/EC. It is a lightweight easy to install insulation with an attractive finish similar to the finish of standard thermal insulation.

It has a resistance to both thermal shock and mould growth (anti-microbial), and can be used in hospitals because it has the required encapsulated insulation to ensure there are no migration of fibres. The encapsulation is an aluminium foil/glass fibre reinforced aluminised polyester scrim.



This scrim provides additional handling strength in addition to providing protection against moisture absorption.

Lindab Thor Duct® insulation has exceptional insulation properties withstanding temperatures of 1200°C. At a typical ambient temperature of 25°C the thermal conductivity would be 0.044 W/mK.

Integrity



The integrity of the entire system is based on the performance of all elements from penetration seals, to smoke leakage to cross sectional area.

When all of the components perform to the required standard, only then can the integrity be classified.

Lindab Thor Duct® achieved exceptional results in all areas and therefore have a level of integrity others can only hope to achieve.

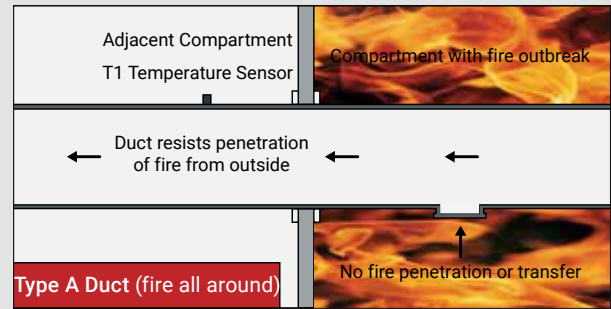
Lindab Thor Duct® achieved a benchmark result for the type of steel ductwork tested which was noted in the independent accredited Warrington Exova test laboratory as not having been achieved before.

Test Type A

Type A testing involves fire outside the duct. The test furnace is raised to operating temperatures of 1000°C with the specimen suspended within. The duct passes through the dedicated penetration seal where various measurements and observations are used to determine its suitability and performance.

In this test no fire passes through the duct. The duct is tested for leakage, integrity and the rise in temperature where the duct is insulated.

Uniquely, the kitchen rating is measured by including 4 thermocouples, fixed to the inside of the ductwork, inside the furnace.

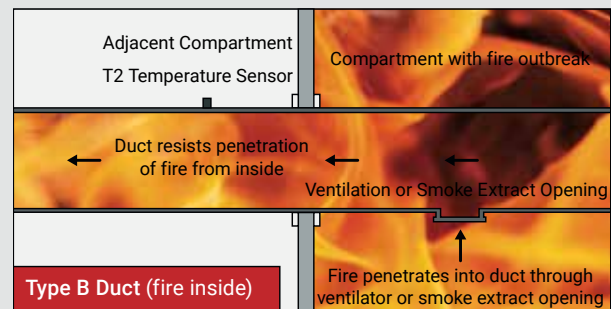


Test Type B

Type B involves fire inside the duct. There is an opening in the duct within the furnace which allows the fire to pass through the duct unimpeded.

A fan connected to the duct extracts hot furnace gas at a velocity of 3 m/s at up to 500pa negative pressure exposing the internal skin to the full fire conditions.

The duct is tested for leakage, integrity and the rise in temperature where the duct is insulated. For this Type B test up to 60 thermocouples are mounted outside the furnace determining the smoke insulation value.



Test Type C

Type C is carried out on smoke extract only. It can only be tested once Type A has been completed at a pressure of 500pa. The insulation value achieved in Type B is the one that is used for this classification.

The cross sectional area is measured uniquely in the Type C test when it is placed under full fire conditions and under pressure of either 150pa, 300pa or 500pa. A test at 1500pa is also conducted at ambient temperatures.



Leakage

Smoke ductwork and fire ductwork have different leakage criteria. Smoke extract is tested to a maximum of 10m³/hr/m² and a low of 5m³/hr/m². Fire duct is tested at a higher rate to a maximum of 15m³/hr/m² and a low of less than 10m³/hr/m².

Lindab Thor Duct® received a classification of “S” in both tests, “S” being the highest classification in this category.

Cross Sectional Area

Cross sectional area is the mechanical stability of the duct being tested. Failure occurs when the duct has a deflection and the cross sectional area is reduced by more than 10%. This is when the duct weakens as a result of full fire conditions and negative pressure causing the duct to convex. The duct becomes redundant when it changes shape sufficiently impairing its functionality and it loses the ability to perform.

Previously under BS the cross sectional area was far more generous (75%) than the new stringent EN standards. **This is because the new EN standard has identified this as a critical requirement to maintain 90% of the cross sectional area throughout the duration of the test.**

Lindab Thor Duct® meets and exceeds this requirement with an exceptional level of integrity.



Test pressure

Test pressure is typically carried out at a minimum of 300pa for fire duct and 500pa for smoke extract. During testing there is an option to increase the pressure to a maximum of 1500 pascals.

Lindab Thor Duct® has tested all ducts to the maximum pressure of 1500pa.



Horizontal & Vertical

The system must be subjected to tests in both a horizontal and vertical orientation.

Orientation can radically change the products performance.

If only one orientation is tested, only that tested orientation can be certified. For example if you test Type A, B & C horizontally, you can only certify horizontal applications and any duct installed vertically cannot be certified.



Classification

The classification shall indicate if the performance criteria are satisfied by fire from inside or fire from outside or both and whether it applies to vertical or horizontal orientations or both.

For example a classification of EI 30 (Ve Ho i ↔ o) indicates a ventilation duct capable of satisfying 30 minutes integrity and insulation from both inside to outside and vice versa in both vertical and horizontal applications.

It is important to note that “t” class in time differs for smoke extract, fire rated ductwork and kitchen extract.

Smoke Extract

30, 60, 90 and 120 minutes

Fire rated/Kitchen Extract

EI 15, 20, 30, 45, 60, 90, 120, and 240

E (uninsulated duct) 30, 60

The classification awarded is based on your performance as a whole and categorised into the nearest time bracket, always rounding down.

For example, if the test achieved a result of 88 minutes, the awarded classification would be 60 minutes, because the result falls short of the next classification of 90 minutes. The classification is based on the first fail of the test. For example, if the test achieves an insulation value of 120 minutes but the penetration

seal fails at 70 minutes, a classification of 60 minutes is awarded. The awarded classification is based on the weakest element of the test.

Classification symbols used:

- E** Integrity
- I** Insulation
- S** Smoke leakage
- t** class in time
- Ve** Vertical Duct
- Ho** Horizontal Duct
- i** fire inside the test (Type B or C)
- o** fire outside the test (Type A)
- i → o** tested for fire inside duct
- i ← o** tested for fire outside the duct
- i ↔ o** tested for both respectively

Thor Duct is classified as follows:

EI 120(h_o v_e) S1500 multi



Both for smoke control ducts and fire resisting ducts

90 minutes and 60 minute systems are also available

Factory Production Control

CE marking of products with harmonised (hEN) standards became mandatory on the 1st of July 2013 as stated within the requirements of the European directive. Consequently smoke extract duct covered by product standard BS EN 12101-7 contains an appendix, ZA3 CE Marking.



National standards, such as BS476 (UK and Ireland), cannot support CE marking of construction products and has been withdrawn where a harmonised standard exists.



Fire resistant ductwork, kitchen extract and pressurisation covered by product standard prEN 15871 will require mandatory CE marking one year after the publication of the standard is qualified in the Official Journal of the EU. The process of CE marking requires a declaration of performance being made after an FPC (Factory Production Control) is put in place. This process is carried out by an approved notified body. The notified body conduct ongoing surveillance of each production facility, ensuring the product is manufactured in accordance with the original tested samples. This provides reassurance for specifiers and buyers in the market. FPC also ensures the fire duct manufacturer has tested all products to the present relevant BS EN tests 1366-1, 1366-8 and 1366-9 at a notified certification body.

There is a requirement for the fire duct manufacturer to have a quality management system (ISO 9001). Lindab Thor Duct® insist on every production facility and Licensee having a maintained FPC in place.



Specification

Lindab Thor Duct® Fire Rated Ductwork

All fire rated and pressurisation ductwork **Lindab Thor Duct®** EN will be to **prEN standard 15871** and tested to **EN 1366-1** vertically and horizontally for Type A (fire outside) and Type B (fire inside).

All ductwork rated “S” for low leakage. All fire rated ductwork will be tested in a flexible wall and be suitable for installation in stud partition, block wall and concrete floor. A classification report to **EN 13501-3** must be provided.

Where duct sizes exceed 1250 × 1000, **Lindab Thor Duct®** XL may be provided for sizes up to 2500 × 1250, with test evidence must be provided to **EN 1366-1**.

Lindab Thor Duct® Smoke Extract

All smoke extract ductwork will be **Lindab Thor Duct®** SE to **(hEN) standard 12101-7** and tested to **EN 1366-8** for multi compartment or **EN 1366-9** for single compartment.

Where multi compartment ductwork is required it must be insulated to the same period of time as the compartment through which it passes.

Insulation to be used must be as tested during **EN 1366-8** test, **(EN 1366-8 Part 6.3)**. Alternatives are not acceptable.

A classification report to **EN 13501-4** must be provided. Evidence of a **Factory Production Control (FPC)** being in place must be provided.

All ductwork must have classification for testing outside (A), inside (B) and smoke extract (C) in both a horizontal and vertical position.

All ductwork rated “S” for smoke leakage and have been tested to high pressure 1500 PA. All smoke extract will be tested in a flexible wall and be suitable for installation in stud partition, block wall and concrete floor.

Thor Duct® Kitchen Extract

All kitchen extract will be **Lindab Thor Duct® KE** to the **prEN standard 15871** and tested to **EN 1366-1**, and must be insulated to the same period of time as the compartment through which it passes. Insulation to be used must be included in the manufacturers test. Alternatives are not acceptable.

All kitchen extract ducting must be accessible for cleaning and inspection purpose and have a cleaning door (to the same fire rating, and tested in the proposed system) installed every 2 linear meters. The cleaning doors must be as tested in the system.

All ductwork must have classification for testing outside (A) and inside (B) in both a horizontal and vertical position. All ductwork rated "S" for low leakage. A classification report to **EN 13501-3** must be provided. Insulation ratings must be both Type B and Type A.

All kitchen extract ductwork will be tested in a flexible wall and be suitable for installation in stud partition, block wall and concrete floor.

Evidence of combustible lining test must be provided, with a minimum 60 minutes performance, Type A, vertical and horizontal.

Training and support

Lindab Thor Duct® has developed a training module for specifiers, licencees and installers to ensure that our fire ductwork systems are ready to perform in the event of a fire incident.

Our product range is a critical part of any fire strategy, and one we all rely on when our worst fears are realised.

For a CPD, please contact your local distributor. Details of support offering can be found at **thorduct.com**.

As an installer, an installation course is also available, contact us by email for the next course.





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