

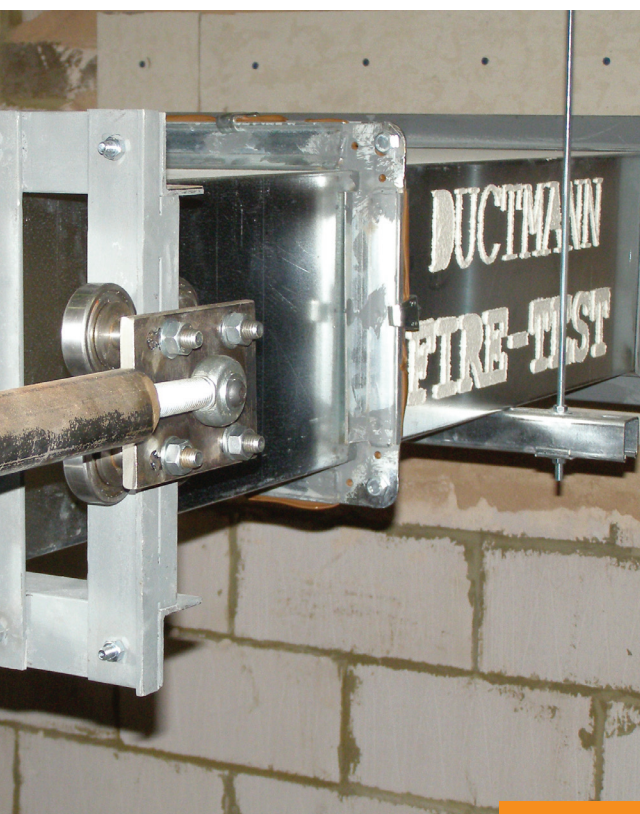


ductmann

Fire Duct

Introduction

Ductmann are based one mile from Junction 10 of the M6, we are ideally located to service the whole of the UK. Established in 1969 we manufacture 'Supply Only' Spiral Tube, Rectangular Ductwork and Flat Oval Ductwork, producing over 1500 tonnes of ductwork per annum from our 2 acre site in the West Midlands. We hold in stock over half a million pounds worth of 'off the shelf' Spiral Tube and Spiral Fittings that can be purchased from our website and delivered anywhere in the UK. Rectangular ductwork and non standard specification ductwork is made to order with quick turn around times. We can use our expertise to break down your drawings into a simplified list of items for quotation and production.



The above shows a duct under test external of the furnace. The rollers prevent the expansion of the duct and measure outward pressure.

Cover picture shows the penetration seal and external ductwork at the furnace wall after 4 hours of testing

With over 40 years experience in manufacturing ductwork and having sent tons of ductwork for fire spraying, with the onset of the new European Standard BS EN 1366 programmed to supersede the British Standard BS476 Part 24, it was an ideal time to develop our own fire rated system.

Our testing program is continual, involving a minimum of eight plus tests on rectangular and spiral ductwork supported vertically and horizontally in the furnace. Our tests are carried out at the British Research Establishment Global a NAMAS/UKAS Accredited Laboratory. Further test requirements are Part 8 covering multi-compartment smoke extraction ductwork and Part 9 covering single compartment smoke extraction ductwork.

Upon request we are able to supply the certified test results to a project Authority, Architect or Consultant.

Advantages of our system

1. **Considerably cheaper than alternative systems.**
2. **No intumescent painted surfaces to get damaged.**
3. **In house manufacturing ensures manufacturing quality and consistency.**
4. **All ductwork manufactured to DW144 Class C (2000 Pa).**
5. **Smooth internal surfaces for cleaning.**
6. **Cost effective alternative to the use of fire dampers/smoke dampers and no on going annual maintenance or inspection costs.**
7. **Our standard construction cover both Duct A and Duct B there is no need to specify when ordering.**
8. **Heavy constructed and fully tested access doors.**
9. **Option of fully welded and grease sealed, suitable for kitchen applications.**
10. **Option of Double Skinned for easy external cleaning.**
11. **No deterioration of the surface due to water/rain etc.**

BS EN 1366 Parts 1,8 & 9

In 2011 the above specification is scheduled to come into force in the UK to replace the currently used BS476 Part 24. The new specification is far more comprehensive and stringent, both rectangular and circular ducts will need to be tested in vertical and horizontal plane within the furnace. The key difference between the specification are that under EN1366 Part 1 the duct has to hold it's integrity under a pressure test of 300 Pa and 500 Pa for a smoke extract system. BS476 Part 24 had no leakage measurement requirement, integrity being based on visual inspection only.

The maximum time rating for un-insulated ductwork to the European Standard is 60 minutes, the Ductmann Fireduct system far outstrips this standard and we are delighted to have achieved the following results.

Test Results

Duct B achieved 240 minutes integrity and stability.

Fire Standard Duct A tested at 500Pa with a leakage rate of $10\text{m}^3/(\text{m}^2/\text{hr})$ for 120 minutes plus, this standard being the minimum requirement before being able to test to smoke standard EN1366 Part 8.

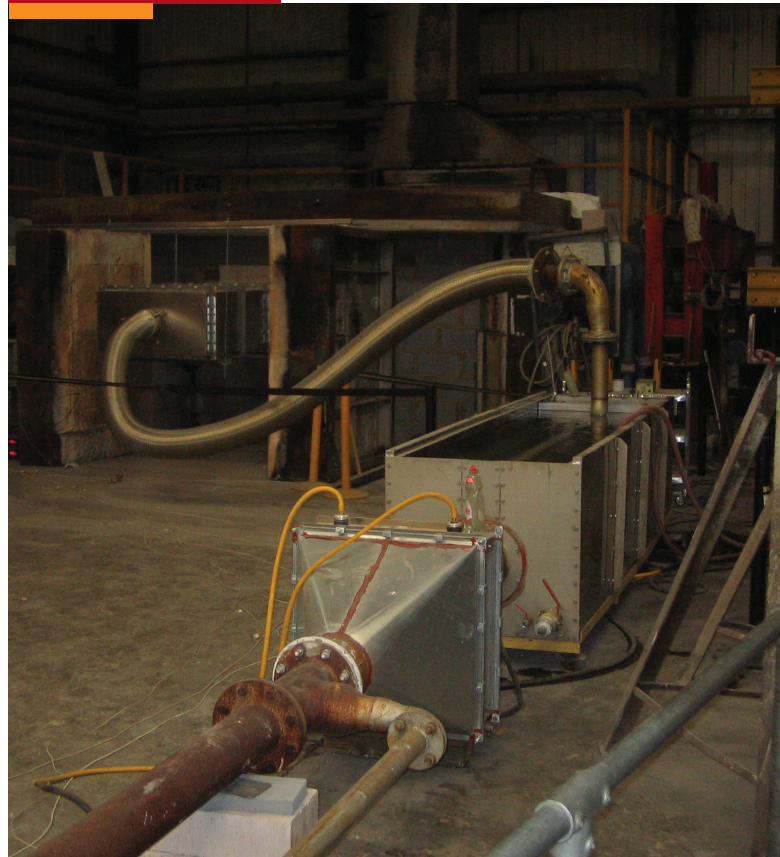
Tested both horizontally and vertically in the furnace to meet the standard.

Fire Duct has also been assessed as suitable for application against British Standard BS 476 Part 24.

BS 5588 Part 9: Fire Resistant Ductwork

The ductwork itself forms a protective shaft, the fire resistance is achieved by the ductwork material itself, or by the addition of a protective material (Rockwool or equivalent) to form a thermal barrier. The fire resistance of the ductwork plus insulation should not be less than the fire resistance required for the area or compartment through which it passes.

Duct A under test at BRE Global tested to -500 Pa. The tanks and coil are required to cool the exhaust gasses down to 40 Deg C so that the pressure/leakage rate of the ductwork in the furnace can be accurately monitored.



Applications

Smoke Extract systems
Dual ventilation/smoke extract systems
Pressurisation systems
Car park extract systems (800 Degrees C)
Non Domestic Kitchen Extract Systems – Also incorporates DW/172 specification for Kitchen and Ventilation Systems. Can be a fully welded mild steel ductwork system with angle iron flange painted after manufacture or our standard galvanized construction.

Insulation Performance

Under test conditions, failure shall be deemed to have occurred when the temperature rise above the initial ambient temperature, on the duct wall outside the furnace, exceeds 140 Degrees as an average or 180 Degrees as a maximum value.

For kitchen extracts this also applies under test A on the inside surface of the thermally lagged ductwork inside the furnace. Since grease can spontaneously combust at 310-360 Degree C.

Without application of thermal insulation our standard ductwork can give 60 minutes thermal insulation at a smoke temperature of 300 degrees C in accordance with EN1366 part 1.

To achieve better thermal insulation at fire temperatures +1100 Degrees C the following thickness of Rockwool or similar slab are fixed to the ductwork, typical methods of application can be obtained from their website www.rockwool.co.uk.

Duct (A) cooled down after a 2 hour test at 1100 Degrees C. Shows limited distortion



Kitchen Extract

30 minutes >> insulation 40mm thick
60 minutes >> insulation 90mm thick

HVCA or Smoke Extract

60 minutes >> insulation 40mm thick
120 minutes >> insulation 90mm thick

Installation

On completion of the ductwork installation prior to the application of the insulation we would site inspect and supply a snagging sheet.

It must be remembered that all fixings, sealants, support rods and bearers etc. are deemed to be part of the system. It is imperative that our installation specification is applied to the letter when installing the ductwork, failure to comply will mean we are unable to issue a Certificate Of Conformity for the overall system.

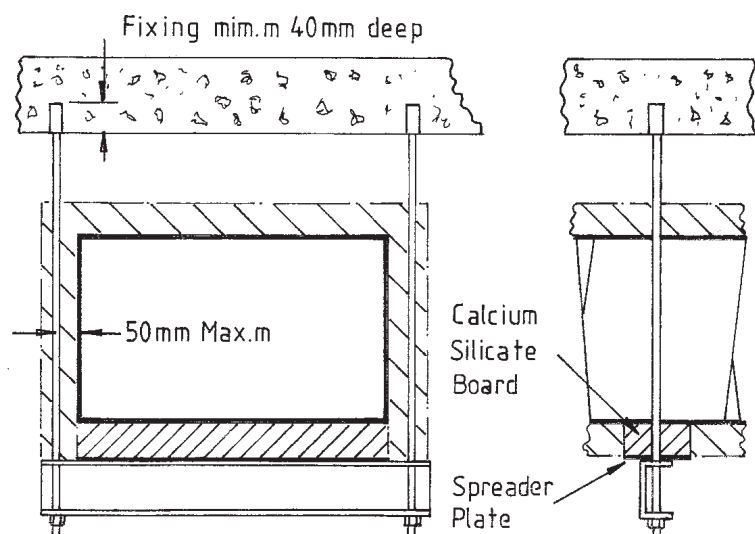
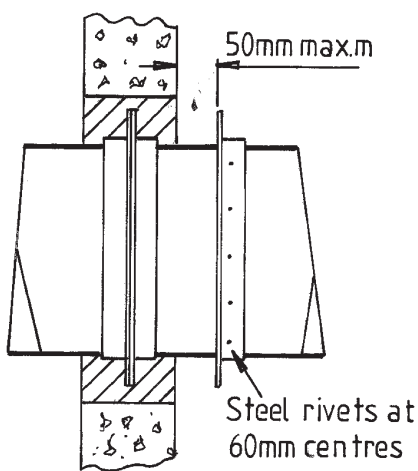
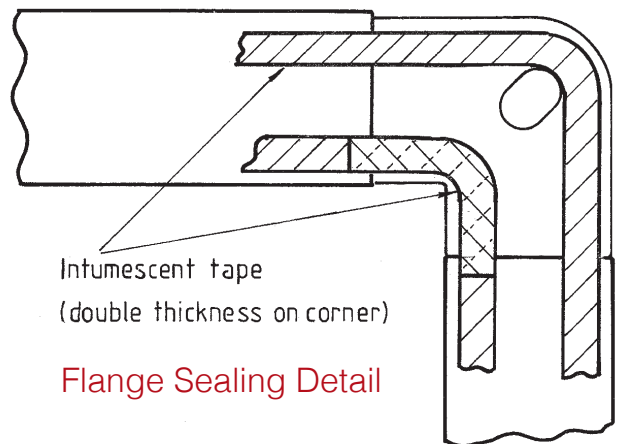
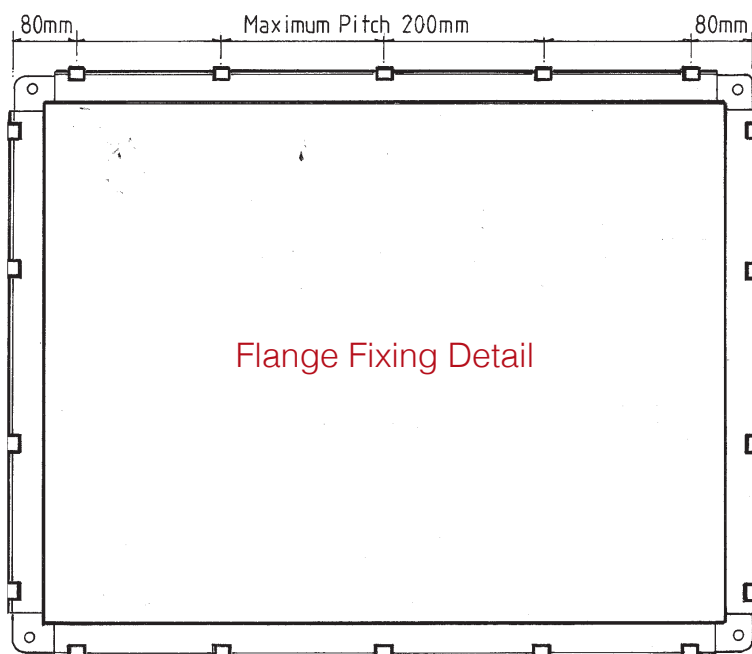
Installation Instructions for Fire Rated Ductwork

Ductwork supported at 1500mm centres, see pages 5 & 6.

Only use Hilti HKD fixings or equivalent Fire rated/Certified fixings.

No other services to be supported off the Fire Rated Ductwork.

Unprotected hangers longer than 1500mm are not permitted under EN 1366 Part 1 standard.



Flange or Stiffener to be fitted at fire rated wall or slab

Ductwork supports (uninsulated ductwork) 2 Hour Rated (Maximum Tensile Stress in Steel 10N/mm²)

Maximum rod length 1500mm Hangers at maximum 1.5 centres
SC=Slotted Channel 2.5mm thick/CH-Steel Channel

A

DEPTH	DUCT WIDTH											
	400	600	800	1000	1250	1400	1500	1600	1700	1800	1900	2000
400	40x40 SC M8 Rod	40x40 SC M8 Rod	40x40 SC M8 Rod	40x40 SC M8 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod
600		40x40 SC M8 Rod	40x40 SC M8 Rod	40x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod
700			40x40 SC M8 Rod	40x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod
800				40x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod
1000				60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod
1100					60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod
1250					60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1300						60x40 SC M12 Rod	60x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1400							60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1500								80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1600								80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1700									80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1800										80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1900											80x40 SC M16 Rod	80x40 SC M16 Rod
2000												80x40 SC M16 Rod

Ductwork supports (40mm thick insulated ductwork) 2 Hour Rated (Maximum Tensile Stress in Steel 10N/mm²)

Maximum rod length 1500mm Hangers at maximum 1.5 centres
SC=Slotted Channel 2.5mm thick/CH-Steel Channel Density of insulation 170kg/m³

B

DEPTH	DUCT WIDTH											
	400	600	800	1000	1250	1400	1500	1600	1700	1800	1900	2000
400	40x40 SC M8 Rod	40x40 SC M8 Rod	40x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
600		40x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
700			60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
800			60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1000				60x40 SC M12 Rod	60x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1100					60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1250					60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1300						80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1400						80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1500							80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1600								80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1700									80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1800										80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1900											80x40 SC M16 Rod	75x38CH M20 Rod
2000												75x38CH M20 Rod

Ductwork supports (90mm thick insulated ductwork) 2 Hour Rated (Maximum Tensile Stress in Steel 10N/mm²)

Maximum rod length 1500mm Hangers at maximum 1.5 centres

SC=Slotted Channel 2.5mm thick/CH-Steel Channel Density of insulation 170kg/m³



DEPTH	DUCT WIDTH											
	400	600	800	1000	1250	1400	1500	1600	1700	1800	1900	2000
400	40x40 SC M10 Rod	40x40 SC M10 Rod	60x40 SC M10 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
600		60x40 SC M12 Rod	60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
700			60x40 SC M12 Rod	60x40 SC M12 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
800				80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1000				80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1100					80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod
1250					80x40 SC M16 Rod	80x40 SC M16 Rod	80x40 SC M16 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod
1300						80x40 SC M16 Rod	80x40 SC M16 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod
1400						80x40 SC M16 Rod	80x40 SC M16 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod
1500								75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod
1600									75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod
1700									75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod
1800										75x38CH M20 Rod	75x38CH M20 Rod	75x38CH M20 Rod
1900											75x38CH M20 Rod	75x38CH M20 Rod
2000												75x38CH M20 Rod

Horizontal Bearer Calculations

Charts A, B & C are calculated using an allowable stress of 10N/mm² and supports at 1500 centres. Should different criteria be required use the following formula. Un-protected hangers longer than 1500mm are not permitted under EN 1366 Part 1

Unprotected hangers made of steel may be sized such that the calculated stresses do not exceed the values given as follows:

ALLOWABLE TENSILE STRESS			
Tensile stress in all vertically oriented components	UPTO 60 MINUTES	OVER 60 MINUTES UPTO 120 MINUTES	OVER 120 MINUTES UPTO 240 MINUTES
		15N/mm ²	10N/mm ²

Note 1: The elongation in mm of the hangers of the test ducts can be calculated on the basis of temperature increases and stress levels. For unprotected supporting systems, the temperature used will be the maximum furnace temperature. For protected steel hangers, the maximum recorded hanger temperature, if available, shall be used. The value represents the elongation limit for hangers with a greater length than in the test.

Note 2: Stress is calculated from supported load only.

An example for the calculation of tensile stress in vertical hanger members

W = weight of duct assembly per unit length - kg/m	L _b = length of bearer - m
W _b = weight of bearer per unit length - kg/m	h = height of drop rod - m
W _r = weight of drop rod per unit length - kg/m	A = cross section area of drop rod* - mm ²
L _h = distance between hanger supports - m	Weight of duct on each hanger support = (W x L _h)kg
	Weight of hanger support = (W _b xL _b +2W _r xh)kg

$$\text{Therefore tensile strength stress in drop rod (o)} \\ = \frac{(W \times L_h + W_b \times L_b + 2W_r \times h) \times 9.82}{2A} \text{ N/mm}^2$$

* If the drop rod is a threaded rod then A is based on the root diameter.

Note 3: The maximum tested stress may be used if greater than above.

Ductmann Limited

Broad lanes, Bilston, West Midlands WV14 0RX.
Telephone: 01902 408291

Site Inspection Check List (Fire Duct to BS EN 1366)

Customer		Sheet No.	
Site Address			
Drawing No.		Order No.	
Area/Item Numbers		Date	
	Check List	Yes	Action Req'd
1	Has correct gasket been used		
2	Are adjacent plant items fire rated and have sufficient fixings on the flange joint		
3	Are support brackets at 1500mm centres		
4	Are drop rods longer than 1500mm		
5	Are drop rods within 50mm of duct sides		
6	Are any other services supported off the ductwork system		
7	Have the correct type of wall or slab fixings been used		
8	Are access doors of the correct type		
9	If insulated have access doors been insulated to insulators specification.		
10	If insulated have isolators & spreader plates been used		
11	Is there a stiffener or flange within the 50mm of penetration seal		
12	Ensure no other services touch the ductwork through the penetration seal, a minimum of 100mm clearance required from galvanized sheet side		
13	Have Fire Duct labels been fitted at a minimum of 3 metre centres		
14	On Spiral metu flange clamping rings been riveted at 200mm centres to flange		
15	Does the ductwork touch any other service or fabric of the building		

Notes

Signature:

Print Name: