

FIRE RESISTANT MORTAR - Installation Guide



NHBC
TYPE APPROVAL

Introduction

The purpose of this document is to give guidance to approved installers and suppliers who are engaged in the fire stopping of openings through floors and compartment walls using the ASTROFLAME ASTRO FR Mortar.

All service holes through floors and compartment walls must be fire stopped to prevent the passage of fire, smoke and hot gases.

To satisfy this demand ASTRO FR Mortar provides a load bearing (up to 1.5KN/Sq.Mtr max) or a non-load bearing fire barrier with the following performance.

- Prevent the spread of fire, smoke and hot gases through a building by containing it in the compartment of origin.
- Maintain the integrity of escape routes from a building.
- Reduce loss or damage to property from the effect of fire and smoke.
- Maintain pressure differential between compartments and ventilation channels.

It is a requirement of the Building Control Regulations 1991 that all holes through floors and compartment walls should be fire stopped. The methods of fire stopping employed shall have been demonstrated to comply following tests conducted in accordance with British Standard BS 476 Part 20: 1987 by an approved independent testing laboratory. NHBC Type Approval.

All installation work must be carried out in accordance with the guidelines laid down in this manual.

THE ASTRO FR Mortar SYSTEM

The ASTRO FR Mortar is an anhydrite calcium sulphate based premixed dry blend and consists of inorganic inert fillers and foamed Perlite. When mixed with water, this produces a trowelable or an easy to pour grade suitable for fire barrier seals through openings in floors and walls.

ASTRO FR Mortar is totally non-combustible to BS 476 Part 4 and EN1366-3. It can be easily designed to provide

a) Non-Load Bearing Seals with up to 4 hrs fire resistance

b) Load Bearing Seals with up to 4 hrs fire resistance

ASTRO FR Mortar expands during cure creating an excellent seal around the service and a strong bond to the surrounding masonry. ASTRO FR Mortar contains no fibers, halogens, solvents, silicone or free added silica.

A unique feature of the ASTRO FR Mortar is that it can be re-activated for up to 2 hours by re-mixing with small quantities of water if necessary every 30 minutes, so eliminating potential waste.

If a NON-LOAD BEARING SEAL is installed in a floor opening, an adequate warning notice or protective covering must be provided to prevent damage to the seal, and possible personnel injury.

If a MAINTENANCE ONLY LOAD BEARING SEAL is installed in a floor opening, an adequate warning notice or protective covering must be provided to prevent damage to the seal and possible personnel injury especially during first 48 hours of drying.

Once the seal is suitably dry, the maximum load bearing capability of the seal is limited to 1.5kn/sq.m - which is considered adequate for most maintenance access purposes.

Also, there should be a warning sign to avoid any point loading on the seal unless the load is spread over an area of minimum 0.09m².

ASTRO FR Mortar is suitable for sealing openings in walls or floor slabs made from various substrates, most commonly brick, blockwork and concrete.

TECHNICAL SPECIFICATION

An anhydrite calcium sulphate based one part mortar available in dry bags, which is noncombustible and designed to provide load bearing or non-load bearing fire barriers.

Density: Typically 1000 -1300kg/cu.m. (dry, when fully cured).

Mean Flexural Strength: 0.59 N/mm²

Compression Strength: 2.4 N/mm²

Shear Strength : 1.0 N/ mm²

Impact Strength: 5.0 N/ mm²

Thermal Conductivity: 0.289 9 + 3%mcw/m K

Fire Resistance: Up to 240 Minutes Integrity & Insulation

Non-combustibility: Non Combustible - BS476 Part 4

Vapour Resistivity: Nominal 500MNs/g.m.

Setting Time: 45-60 Minutes.

Storage: Ideally between 5° & 35° Celsius. Six months shelf life provided bags are sealed and stored in dry, well-ventilated conditions.

Installation

ASTRO FR Mortar can be simply installed using the following tools and equipment:-

- Mixing Container
- Power Assisted Stirrer
- Suitable Litre Measure
- Steel Tape Measure
- Hack-Saw
- All purpose Saw
- Plastic Sheeting
- Power Drill
- Drill Bit (Various Sizes)
- Expanding Steel Anchors
- Pointing Knife/Pallet Knife or Similar
- Float
- Dust Pan and Brush
- 10mm Diameter Steel Rods
- 30mm x 30mm x 3mm Steel Angle or Similar

Ensure that all services are complete and installed to the satisfaction of the main contractors representative, and in accordance with the recommendations of the relevant manufacturer or supplier.

Remove all unnecessary combustible materials from the aperture.

Using brush and dustpan, sweep all loose materials from the inner surface of the aperture and surrounding area local to the installation.

Place plastic sheet beneath the working area to catch any falling materials.

Remove any insulation or lagging on ducts or pipes in order to ensure a good seal with the ASTRO FR Mortar and moisten porous slab or wall or wall edges prior to installation.

Waste Disposal - observe recommendations on Health and Safety data sheets in this manual.

The essential material required for the installation of ASTRO FR Mortar in accordance with the Building Regulations 1991 are detailed below.

Depending of the seal configuration, the period of fire resistance required, the aperture dimensions, and any load bearing requirement (maximum 1.5 KN / Sq.Mtr), then reinforcing materials may need to be installed. The positioning of any reinforcement must beat the mid-point of the seal.

The recommended method of providing reinforcement is by installing 10mm diameter mild steel round bar spanning the shortest distance of the aperture, supported on 30mmx30mmx3mm mild steel angle at either 400mm or 600mm centres (see table below)

Typical reinforcement requirements for non-load bearing and load bearing seals are given in tables 1 and 2 below.

Table 1 Non Load Bearing Seals

Width of Opening	Length of Opening	Reinforcement Required
Up to 1000mm	Up to 1000mm	NONE
Up to 1000mm	1000mm +	NONE
Up to 1500mm	1000mm+	NONE

Table 2 Load Bearing Seals (Maximum 1.5 KN/Sq.Mtr)

Width of Opening	Length of Opening	Reinforcement BarSpacing	Reinforcement BarSpacing
		55MM Mortar Thickness	75MM Mortar Thickness
Up to 1000mm	Up to 1000mm	NONE	NONE
Up to 500mm	1000mm – 2000mm +	600mm centres	NONE
500mm – 1000mm	1000mm – 1500mm	400mm centres	NONE
500mm – 1000mm	1500mm – 2000mm +	400mm centres	400mm centres

For openings with different dimensional characteristics, then please consult ASTROFLAME FIRESEALS LTD for advice.

PERIMETER ANGLES

2 No. 30mmx30mmx3mm thick mild steel angles should be positioned within the mid third of the thickness of the seal, each being fixed to opposite sides along the full length of the aperture using noncombustible expanding anchors, or similar.

It is recommended that 8mm x 75mm long rawl bolts or similar are used for expanding anchors.

10MM ROUND BAR

The 10mm Round Bar mild steel rod reinforcement must be individually positioned so as to span the width of the aperture (the shortest dimension) at either 600mm or 400mm centres along the full length of the seal, (subject to the position of any services passing through the aperture). As an alternative, suitable reinforcing mesh can be used in place of the round bar.

ALLOWANCE FOR THERMAL EXPANSION

An allowance for expansion of the steel reinforcement must be provided so that they do not bow and / or distort in a fire situation causing possible damage to the ASTRO FR Mortar Seal.

This allowance must be at least 0.5% of the length of reinforcement (5mm per metre length).

SHUTTERING

Depending on the fire rating required, fix suitable shuttering so that the required seal thickness can be achieved. Typical materials used for this purpose include mineral fiber board, timber, expanded metal such as Expamet, polystyrene etc. However, combustible material should be removed a minimum of 48 hours after the completion of the seal.

If access is limited to the top of the floor only, shuttering should be installed first with noncombustible materials and then the reinforcement installed if necessary.

Openings in walls require shuttering on both sides with a small gap/hole left for filling with compound.

Once the shuttering and fixing of reinforcement if any are complete, the opening is ready for filling with the ASTRO FR Mortar.

MIXING AND FILLING

Based on the recommendations add the required amount of mortar to water and mix to a smooth consistency using a power stirrer.

It is necessary to mix a trowelable consistency initially and fill manually around penetrations and small voids. Once the small holes are sealed, finish the opening to the required thickness by pouring the mortar.

Finally, smooth surface using a float if necessary.

When shuttering is removed, fill any gaps left using a trowelable grade of mortar to complete installation.

Apply a suitable warning label and barrier covers to prevent accidental damage to seal or possible personnel injury.

GUIDE TO MIXING

The following mixing ratios are approximate only. Actual quantities required to achieve appropriate consistencies will be determined by environmental and prevailing site conditions.

Coverage	Dry Mortar to Water	55mm seal	75mm seal
For pourable grade	2:1	61 kg per m ²	83 kg per m ²
For trowelable grade	3:1	63 kg per m ²	85 kg per m ²

Health and Safety

A Health and Safety Data Sheet for ASTRO FR Mortar is attached for the benefit of all personnel concerned with safe handling.

As with all construction site work, operatives should wear an approved safety hat to BS 5240 Part 1 at all times during installation. Additionally, all operators should comply with the Health and Safety Regulations regarding Fire Safety etc., and if in doubt consult the Site Safety Officer.

All operators must follow manufacturers instructions and guidelines set out by the Safety Officer in charge, when handling all the materials and equipment.

Quality Control Procedure

On completion of the installation of the ASTRO FR Mortar Seal, an inspection should be carried out in accordance with the following recommendations.

- a) Ensure the correct procedures are followed in accordance with the latest ASTRO FR Mortar Installation Manual.
- b) Ensure approved material is used for the installation of the ASTRO FR Mortar Seal.
- c) General quality checks as follows: -

- 1) Suitable shuttering to give minimum recommended thickness of seal.
 - 2) Check the location of the reinforcements (if any) are at the midpoint of the seal thickness.
 - 3) Check the length of reinforcement to allow for thermal expansion as per recommendation.
 - 4) Ensure the size of the opening and the reinforcement, if any, are based on the recommendations given in this manual.
 - 5) Ensure the ASTRO FR Mortar is mixed to a smooth consistency before pouring into the opening.
 - 6) Ensure suitable warning labels and adequate covers are used during drying of the seal and appropriate warning labels to show load bearing/non-load bearing capability.
- d) Check for good all-round workmanship.
- e) Maintain all records of inspection with reference to the specific project, location, seal reference, fire-rating etc.

If there is any doubt or the requirements are outside the recommendations given in this document, please consult ASTROFLAME FIRESEALS LTD for further recommendations.

Compliance

If the installer is required to provide a certificate of compliance then this should only be issued when all of the above criteria have been satisfied.

Storage and disposal

Astro FR Mortar should be stored indoors.

Storage: Ideally between 5° & 35° Celsius. Six months shelf life provided bags are sealed and stored in dry, well-ventilated conditions. For additional testing, certification or technical information please contact ASTROFLAME FIRESEALS LTD.
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