

HIGH STRENGTH COMPOUND - **AFFCHS**



- Prevent the spread of fire, smoke and hot gases through a building by containing it in the compartment of origin.
- Maintain the integrity of the 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

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® HS FM System. All service holes through floors and compartment walls must be fire stopped to prevent the passage of fire, smoke and hot gases. Astroflame® HS FM System will provide a load bearing or a non-load bearing fire barrier.

ASTROFLAME® HS COMPOUND SYSTEM

The Astroflame® HS FM System is a hydrite sulphate based pre-mixed dry blend and consists of inorganic inert fillers and foamed perlite. When mixed with water this produces a trowelable or pourable consistency suitable for fire barrier seals through openings in floors or walls. The Astroflame® HS FM is totally non-combustable and can be easily designed to provide either load-bearing or non-load-bearing seals for 2, 4 or 6 hour fire barriers. The Astroflame® HS FM expands when activated with water creating an excellent seal around the service and a strong bond to the surrounding masonry. Astroflame® HS FM contains no fibres, halogens solvents, silicone or free added silica. A unique feature of the Astroflame® HS FM System is that it can be react vated for up to 2 hours by remixing with 25ml 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 **LOAD BEARING SEAL** is installed in a floor opening, an adequate warning notice or protective covering must be provided to prevent the damage to the seal and possible personnel injury especially during the 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 more than adequate for maintenance personnel access. (For increased loading please see below). Also, there should be a warning sign with information to avoid any point loading on the seal unless the load is spread over an area of minimum 0.09m².

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PREPARATION FOR INSTALLATION

Ensure that all service penetrations are complete and installed to the satisfaction of the main contractors representative. Remove all unnecessary combustible materials from the hole. Using brush and dustpan, sweep all loose products from the inner surface of the hole 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 Astroflame® HS FM System.

INSTALLATION OF ASTROFLAME® HS COMPOUND

Once opening is prepared for installation shuttering should be installed to prevent the spillage of Astroflame® HS Compound, ensuring a tight fit around the penetrating services and the edges of the seal. Install steel reinforcement as required in table 1 to allow the correct load bearing capacity or should no load bearing capacity be required but the opening is greater than 1200mm x 1200mm. Maximum size for non-load bearing seals is 1.44sq/mt. Ensure that all reinforcement steel is fixed positively using expanding Rawl bolts or cartridge nails. Add the dry Astroflame® HS Compound powder to the required quantity of water as set out in table 5, to achieve the correct consistency. Allow to stand... between 5/10 minutes. Pour approximately 15mm depth of Astroflame® HS FM in to the base of the seal, covering the shuttering totally and closing any small void around the services. Fill the opening to the required depth with Astroflame® HS Compound to achieve the correct fire rating as set out in table 2. To complete the seal smooth the surface using a float if necessary. When shuttering is removed fill any gaps using a trowelable grade of Astroflame® HS Compound to complete the installation. Full cure is 8 weeks. Apply a label detailing installation date and type of seal.

SHUTTERING

Depending on the fire rating required fix the suitable shuttering (Stone wool, expermet steel, polystyrene or wood) so that the required seal thickness can be achieved. Please note that all combustible shuttering products should be removed when Astroflame® HS Compound has set. For wall installations it may be necessary to install shuttering from both sides of the opening and fill at the upper most gap.

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STEEL REINFORCEMENT

Based on the recommendations of the approved fire test authority, a number of different designs are used depending on the size of the opening and the load-bearing requirement as detailed in table 3 over page. In the case of all load bearing fire barriers with reinforcement, the position of reinforcement must be at the mid-point of the seal to allow foot traffic.

SYSTEM FOR SUPPORTING MORTAR		TABLE 01
System A	30mm x 30mm x 1.6mm mild steel angles spanning the shortest dimension at 900mm centres or nearest. Fixing angles to be of the same dimensions fixed with 8mm Rawl bolts.	
System B	30mm x 30mm x 1.6mm mild steel angles spanning the shortest dimension at 600mm centres or nearest. Fixing angles to be of the same dimensions fixed with 8mm Rawl bolts.	
System C	10mm diameter mild steel rod (rebar) at 250mm centres or nearest. To be fixed by drilling the concrete opening to allow the steel bar to lie within, giving a minimum of 50mm insert into the concrete.	
System D	40mm x 40mm x 2mm mild steel angles bolted back to back forming a 400mm grid matrix. Fixing angles to be of the same dimensions fixed with 8mm Rawl bolts.	
System E	40mm x 40mm x 2mm mild steel angles bolted back to back forming a 300mm grid matrix. Fixing angles to be of the same dimensions fixed with 8mm Rawl bolts.	
System F	P1000 Unistrut 41mm x 41mm spanning the shortest dimension at 600mm centres or nearest. Fixed to the concrete floor using 8mm Rawl bolts.	
System G	60mm x 60mm x 8mm mild steel angles spanning the shortest dimension at 250mm centres or nearest. Fixing angles to 40mm x 40mm x 4mm fixed with 8mm Rawl bolts.	
System H	80mm x 80mm x 8mm mild steel angles spanning the shortest dimension at 500mm centres or nearest. Fixing angles to 40mm x 40mm x 4mm fixed with 8mm Rawl bolts.	
System I	80mm x 80mm x 8mm mild steel angles spanning the shortest dimension at 250mm centres or nearest. Fixing angles to 80mm x 80mm x 8mm fixed with 10mm Rawl bolts.	
System J	100mm x 100mm x 12mm mild steel angles spanning the shortest dimension at 500mm centres or nearest. Fixing angles to 80mm x 80mm x 8mm fixed with 10mm Rawl bolts.	

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FIRE RESISTANCE AND MORTAR THICKNESS			TABLE 02
1	1 Hour Rating at 50mm Thick	Only to be used up to a span of 600mm in a LOAD BEARING situation or up to 4700mm in a NON LOAD BEARING situation	
2	2 Hour Rating at 75mm Thick	Only to be used to a span of 1000mm in LOAD BEARING situation	
3	2 Hour Rating at 100mm Thick		
4	4 Hour Rating at 100mm Thick		
5	4 Hour Rating at 150mm Thick		

SEAL REINFORCEMENT TABLE					TABLE 03
SPAN	Non-Load Bearing	1.5kN/m ²	2.5kN/m ²	5kN/m ²	
	Type 1,2 or 4a	Type 2,3 or 4	Type 3 or 5	Type 3 or 5	
Up to 1.44m ²	No requirement				
Up to 600mm	A	A + C or D	D	E	
Up to 900mm	B	B + C or D	E	E	
Up to 1500mm	B + C or D or F	D	E	G or H	
Up to 2000mm	B + C or D or F	E	G or H	G or H	
Up to 3000mm	B + C or D or F	E	G or H	I or J	
Up to 4700mm	B + C or D or F	F or G			

Astroflame® HS Compound is available in 20kg dry bags. When it is mixed with clean water with a normal Ph (7.2 approx) it sets to a thermally insulating material, which is off white in colour. The coverage and water requirements for 1, 2 and 4-hour seals are given in table 5. Full weights per m² can be found in table 4.

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MORTAR REQUIRED (KG) PER WIDTH, LENGTH AND FIRE RESISTANCE												TABLE 04
Width (mm)	Fire Rating	Length (mm)										
		100	200	300	400	500	600	700	800	900	1 mtr	
100	1	0.43	0.87	1.30	1.73	2.16	2.59	3.02	3.46	3.89	4.32	
	2	0.64	1.28	1.92	2.56	3.20	3.83	4.47	5.11	5.75	6.39	
	4	0.86	1.71	2.57	3.42	4.28	5.13	5.99	6.84	7.70	8.55	
200	1	0.87	1.73	2.59	3.46	4.32	5.18	6.04	6.91	7.78	8.64	
	2	1.28	2.56	3.83	5.11	6.39	7.67	8.95	10.22	11.50	12.78	
	4	1.71	3.42	5.13	6.84	8.55	10.26	11.97	13.68	15.39	17.10	
300	1	1.30	2.59	3.89	5.18	6.48	7.78	9.07	10.37	11.66	12.96	
	2	1.92	3.83	5.75	7.67	9.59	11.50	13.42	15.34	17.25	19.17	
	4	2.57	5.13	7.70	10.26	12.83	15.39	17.95	20.52	23.09	25.65	
400	1	1.73	3.46	5.18	6.91	8.64	10.37	12.10	13.84	15.55	17.28	
	2	2.56	5.11	7.67	10.22	12.78	15.34	17.89	20.45	23.00	25.56	
	4	3.42	6.84	10.26	13.68	17.10	20.52	23.94	27.36	30.78	34.20	
500	1	2.16	4.32	6.48	8.64	10.80	12.96	15.12	17.28	19.44	21.60	
	2	3.20	6.39	9.59	12.78	15.98	19.17	22.37	25.56	28.76	31.95	
	4	4.28	8.55	12.83	17.10	21.38	25.65	29.93	34.20	38.48	42.75	
600	1	2.59	5.18	7.78	10.37	12.96	15.55	18.14	20.74	23.33	25.92	
	2	3.83	7.67	11.50	15.34	19.17	23.00	26.84	30.67	34.51	38.34	
	4	5.13	10.26	15.39	20.52	25.65	30.78	35.91	41.04	46.17	51.30	
700	1	3.02	6.04	9.07	12.10	15.12	18.14	21.17	24.19	27.21	30.24	
	2	4.47	8.95	13.42	17.89	22.37	26.84	31.31	35.78	40.26	44.73	
	4	5.99	11.97	17.95	23.94	29.93	35.91	41.90	47.88	53.87	59.85	
800	1	3.46	6.91	10.37	13.84	17.28	20.74	24.19	27.65	31.10	34.56	
	2	5.11	10.22	15.34	20.45	25.56	30.67	35.78	40.90	46.01	51.12	
	4	6.84	13.68	20.52	27.36	34.20	41.04	47.88	54.72	61.56	68.40	
900	1	3.89	7.78	11.66	15.55	19.44	23.33	27.21	31.10	34.99	38.88	
	2	5.75	11.50	17.25	23.00	28.76	34.51	40.26	46.01	51.76	57.51	
	4	7.70	15.39	23.09	30.78	38.48	46.17	53.87	61.56	69.26	76.95	
1 mtr	1	4.32	8.64	12.96	17.28	21.60	25.92	30.24	34.56	38.88	43.20	
	2	6.39	12.78	19.17	25.56	31.95	38.34	44.73	51.12	57.51	63.90	
	4	8.55	17.10	25.65	34.20	42.75	51.30	59.85	68.40	76.95	85.50	

10% allowance for penetrations included in calculation	
1 Hour Rating	50mm Thickness
2 Hour Rating	75mm Thickness
4 Hour Rating	100mm Thickness

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TABLE 05	By Volume Powder:Water	1 Hour Seal 50mm Thick	2 Hour Seal 75mm Thick	4 Hour Seal 100mm Thick
For Pourable Grade	3:2 (approx)	48 kg dry mortar per m ²	71 kg dry mortar per m ²	95 kg dry mortar per m ²
For Trowelable Grade	2:1 (approx)	51 kg dry mortar per m ²	75 kg dry mortar per m ²	100 kg dry mortar per m ²
Wall Trowelable	3:1	45kg dry mortar per m ²	71kg dry mortar per m ²	95kg dry mortar per m ²