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# Armourcoat Acoustic - Specification Planning

## General product description

The Armourcoat Acoustic Plaster System offers the appearance of a consistent smooth seamless marble plaster surface whilst delivering exceptional sound absorption and acoustic performance.

Armourcoat have used their considerable expertise in the formulation of marble based plaster finishes to create an elegant plaster finish that appears smooth and even but still allows sound waves and energy to pass through the surface to be absorbed and attenuated in the layer of mineral wool beneath.

The Armourcoat Acoustic Plaster System comprises of a special mineral wool composite panel pre-coated with the Armourcoat Acoustic Basecoat plaster. The panels are bonded onto the substrate using Armourcoat Bondplast and then finished with a seamless layer of the Armourcoat Acoustic Topcoat plaster.

## Construction of Suspended Ceiling ( BS EN 13964)

Armourcoat Acoustic system will conform to BS EN 13964 for suspended ceilings provided it is constructed in accordance with the following :

Ceiling grid system will be constructed from Metal frame hanger system designed to accommodate a minimum hanging load of 20kg/m<sup>2</sup>

One layer of 12.5mm Plasterboard to be fixed to metal frame grid with screw centres of 300mm maximum.

Plasterboard to be taped and jointed to leave a flush flat surface. Armourcoat Acoustic system ( 30mm / 50mm ) to be bonded onto the plasterboard with Bondplast adhesive.

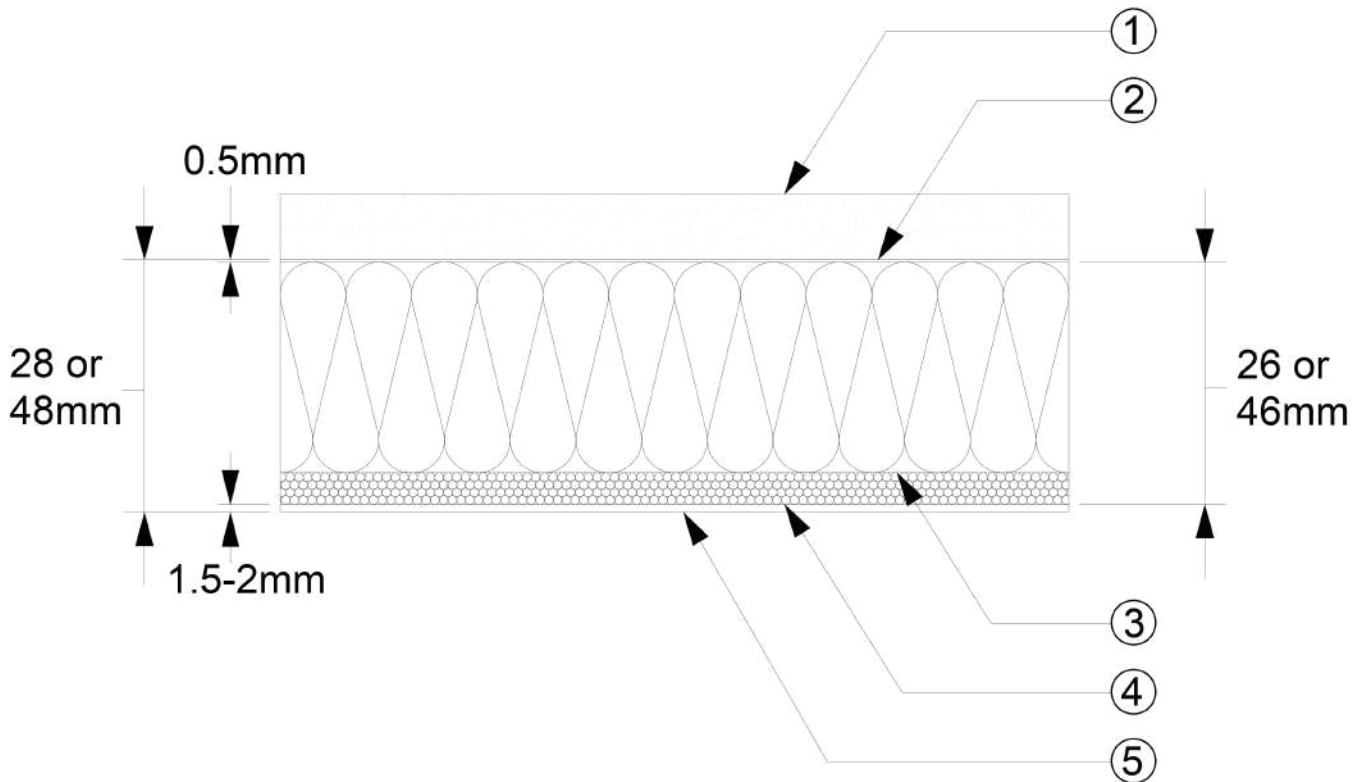
Reaction to Fire	A2-S1-D0 / Class '0'
Release of Asbestos	None
Release of Formaldehyde	None
Load Bearing capacity	> 20kg/m <sup>2</sup>
NRC Sound Absorbtion 30mm / 50mm	0.8/ 0.9
Thernal conductivity	0.035 W/MK

## System build up

The Armourcoat Acoustic Plaster System comprises of a special mineral wool panel pre-coated with a porous mineral basecoat (Armourcoat Acoustic Basecoat) and calibrated to an exact thickness. This board is adhered to the substrate with a gypsum adhesive (Armourcoat Bondplast) and any minor discrepancies between panels is sanded out. The joints/seams are then filled with joint filling compound (Armourcoat Acoustic Filler) that is essentially the same composition as the basecoat that has been factory applied to the boards.

Once dry the entire surface is sanded to a flat smooth surface. The Armourcoat Acoustic Topcoat plaster is then applied in a single layer to create a continuous seamless surface.

## Armourcoat Acoustic Plaster - System Detail



- 1 Plasterboard Substrate
- 2 Armourcoat Bondplast
- 3 Mineral Wool Panel (20/40mm)
- 4 Armourcoat Acoustic Board Coating
- 5 Armourcoat Acoustic Topcoat

### Properties of the Armourcoat Acoustic Plaster System

- excellent sound absorption over a wide range of frequencies
- mineral based system that is non combustible and non flammable
- mineral wool panels manufactured from a minimum of 70% post consumer recycled glass
- the Armourcoat Acoustic Basecoat made from expanded glass foam granules with 85% post consumer recycled content
- the Armourcoat Acoustic Topcoat plaster made from 80% pre-consumer crushed marble
- all components in system contain no VOCs (Volatile Organic Compounds)
- factory prepared panels for immediate installation and shorter site drying times
- seamless finish
- resistant to mould and mildew
- up to 200m<sup>2</sup> without joints
- wide range of colours available
- suitable for both flat and curved surfaces

## Acoustic performance

Independent tests were carried out in the UK on the Armourcoat Acoustic Plaster System to determine the Noise Reduction Coefficient (NRC) ratings and the system's sound Transmission Class (STC) ratings.

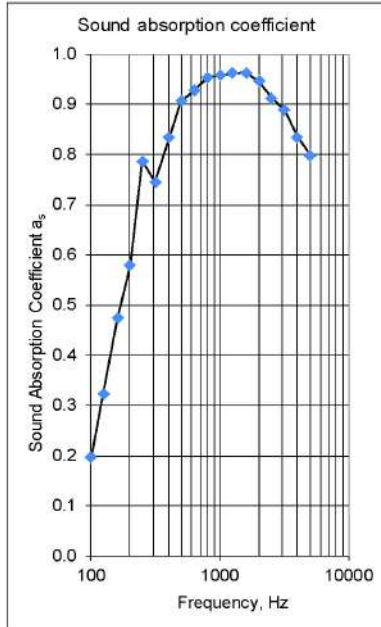
Tests were carried out in accordance with BS EN ISO 20354: 2003

'Acoustics - measurement of sound absorption in a reverberation room'.

### Results: 50mm system - NRC 0.9

Frequency Hz	Absorption $a_s$
100	0.20
125	0.32
160	0.47
200	0.58
250	0.79
315	0.75
400	0.83
500	0.91
630	0.93
800	0.95
1000	0.96
1250	0.96
1600	0.96
2000	0.95
2500	0.91
3150	0.89
4000	0.83
5000	0.80

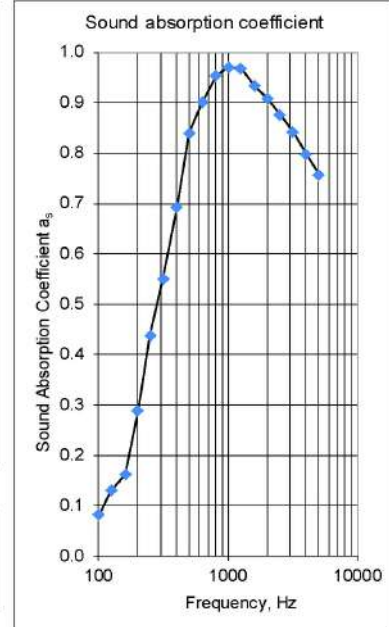
BS EN ISO 11654  
Sound absorption  
class = **A**  
 $a_w$  = 0.95



### Results: 30mm system - NRC 0.8

Frequency Hz	Absorption $a_s$
100	0.08
125	0.13
160	0.16
200	0.29
250	0.44
315	0.55
400	0.69
500	0.84
630	0.90
800	0.95
1000	0.97
1250	0.97
1600	0.93
2000	0.91
2500	0.88
3150	0.84
4000	0.80
5000	0.76

BS EN ISO 11654  
Sound absorption  
class = **C**  
 $a_w$  = 0.75



## Fire testing

Independent tests were carried out in the UK on the Armourcoat Acoustic Plaster System for fire spread the system achieving a **Class 0** status.

**Test:** to assess the results of tests to BS 476:Part 6:1989+A1 and BS 476: Part7:1997

Generic (description)	Product (reference)	Thickness	Weight per unit (area of density)
Acoustic Plaster System	Armourcoat Acoustic	50mm	14.39kg/m <sup>2</sup>
Individual components used to manufacture composite			
Topcoat	Armourcoat Acoustic Topcoat	2mm	1400kg/m <sup>3</sup>
First coating product	Armourcoat Board Coating	5-7mm	400kg/m <sup>3</sup>
Mineral wool board	Acoustic Slab	40mm	70-100kg/m <sup>3</sup>
Gypsum	Armourcoat Bondplast	2-3mm	1800kg/m <sup>3</sup>
Determined by Exova Warringtonfire			

**Results:** tests to BS 476:Part 6:1989+A1 and BS 476: Part7:1997 demonstrate that the product complies with the requirements for **Class 0** as defined in paragraph A13(b) of Approved Document B, 'Fire Safety' to the Building Regulations 2000.

Class 0 - is a requirement under UK Building regulations for walls or ceilings where limited combustibility is **required** in high-risk areas, such as escape routes. To comply with Class 0 materials must have a Class 1 **Surface Spread of Flame** and low fire propagation index, in accordance with **BS 476** Part 6.

Independent tests were also carried out in the UK on the 50mm Armourcoat Acoustic Plaster System, for classification of reaction to fire performance in accordance with EN13501-1:2007+A1: 2009.

Fire Behavior	Smoke production	Flaming Droplets
A2	s1	d0

**Results:** reaction to fire classification in accordance with clause 10 of EN13501-1:2007 and BS EN 14509: **A2 - s1, d0**

## Environmental properties and LEED

Every effort has been made in the design and formulation of the Armourcoat Acoustic Plaster System to make it as environmentally friendly as possible.

The entire system is zero VOC and all other components of the system are made largely from recycled materials with the exception of the Armourcoat Bondplast.

LEED is a set of performance standards based on existing and proven technology to evaluate environmental performance from a whole building perspective over the building's lifecycle. They provide a definitive standard for what constitutes a green building in design, construction and operation.

**Contribution statement:** The Armourcoat Acoustic Plaster System qualifies for points under the LEED Green Building Rating System.

LEED guidelines vary from one program to another. Categories may change. Consultation with the Green Building Certification Institute is recommended.

### EA Credit 1 - Optimise Energy Performance

The Armourcoat Acoustic high density mineral wool panels provide additional thermal insulation which reduces energy use for optimised energy performance.

### MR Credit 4 - Recycled Content

The Armourcoat Acoustic plaster consists of up to 80% recycled content including post consumer and pre consumer recycled material.

**IEQ Credit 4 - Low Emitting Materials**

The Armourcoat Acoustic Plaster System has no harmful volatile organic compounds.

**IEQ Credit 7.1 - Thermal Comfort, Design**

The Armourcoat Acoustic high density mineral wool panels provide an excellent source of thermal insulation which reduces energy use and provides improved thermal comfort.

**EQ Credit 9 - Enhanced Acoustical Performance**

The Armourcoat Acoustic Plaster System has been professionally and independently tested proving it will effectively absorb and disperse sound energy thus decreasing echo and reverberation resulting in a much improved sound quality environment

**Substrate preparation**

The Armourcoat Acoustic Plaster System can be applied to a wide range of substrates which should be firm and true and will not move or crack. The most common substrate for the system is plasterboard suspended on a metal frame system. All joints should be taped with a reinforcing mesh and the joints filled flush with the surface.

Suitable substrates include concrete, block, brickwork, cement particle board or taped and jointed plasterboard. MDF or plywood are **not** suitable substrates for the Armourcoat Acoustic Plaster System.

The Armourcoat Acoustic Plaster System can also be applied directly to a concrete or blockwork substrate.

Substrates to receive the system directly must be flat and true, devoid of undulation and with all fixtures and fittings already installed by others.

The Armourcoat Acoustic panels are cut and shaped in order to accurately include and house all fixtures and fittings.

Armourcoat or its partners will check substrate quality and suitability with the contractor prior to any system installation. In the event of concerns Armourcoat or its partners will advise on any amendments required. Armourcoat takes no responsibility for substrate build and suitability for installation.

Works should not commence until all necessary rectifications have been made and no further adjustments will be made to the location of lights, sprinkler heads etc.,

All fixtures and fittings must be installed to the necessary depth relative to the thickness of the system panels. Such detailing to be discussed at pre-order meetings between Armourcoat or its partners and the specifier/contractor.

Substrates must be solid and airtight to ensure that air only enters the system without passing through the acoustic layer into the ceiling void.

Any gaps between fixtures and fittings set into the substrate must be sealed at the substrate point to prevent air movement.

Vents can be introduced to allow for pressure equalisation between the ceiling void and the room or space being treated with the Armourcoat Acoustic Plaster System if required.

**Curved and domed surfaces**

The Armourcoat Acoustic Plaster System can be used on both single curved and double curved surfaces.

The 50mm system is suitable for curves of down to a 3 metre radius without any modification. For tighter radius curves the mineral wool on the rear of the boards can be cut with parallel slots to increase the boards curvature.

The 30mm system is suitable for curves down to a 1 metre radius.

There will be an additional cost for curved and double curved surfaces which will depend upon the complexity of each particular project.

**Colours**

The Armourcoat Acoustic Plaster System can be tinted to a wide range of colours to suit the requirements of any particular project. Armourcoat only use high quality light fast pigments to tint the Acoustic plasters.

The base white Armourcoat Acoustic plaster derives its colour from the Bianco Carrara marble from which it is made. As the topcoat is made from a natural mineral it is not uncommon to get the occasional minute grey particle in the surface but these are only visible when viewed close up.

The natural marble tone is subject to slight natural variation from batch to batch and this may have a slight affect on the very light pastel tones.

**Application process**

There are four main steps to the installation of the Armourcoat Acoustic Plaster System once the substrate has been fully prepared and all the fixtures and fittings are in place and the ceiling structure is airtight.

1. Fixing of the Armourcoat Acoustic boards to the ceiling with the Armourcoat Bondplast adhesive
2. Filling the joints or seams with the Armourcoat Acoustic Filler compound
3. Sanding off the excess joint filler and checking the flatness or final shape of the surface prior to the application of the Armourcoat Acoustic Topcoat
4. Application of the Armourcoat Acoustic Topcoat plaster and final smoothing down with Superflex finishing trowel.

Armourcoat has a full installation manual for partners which covers all aspects of substrate preparation, design detailing and installation procedures.

## Installation duration for the full Acoustic system

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Fix Armourcoat Acoustic panels with adhesive	x				
Apply Armourcoat Acoustic Filler to seams	x				
Drying		x		x	
Sanding joints and face of panels			x		
Application of Acoustic Topcoat paster			x		
Installation of lights etc.,					x

These are based upon filling standard joints with good drying conditions of 20°C and RH of 50% or below and modest air circulation. Where the board filler has been applied to a thickness of more than 7mm or there is high humidity and or lower temperatures the drying periods will increase.

## Quality control of application

The Armourcoat Acoustic Plaster System will be supplied and installed either directly by Armourcoat Ltd or by Armourcoat partners worldwide. All partners will have undergone training in the application of the system. Armourcoat or its appointed local partners will be responsible for the quality of installation work. For complex or challenging projects Armourcoat Ltd will support its partners with technical advice and onsite support when required.

## Exposure of surface to acute lighting

In situations where the finished surface will be exposed to acute lighting from windows or cross lighting it is vital that the final lighting is in place at the point of application. If the natural lighting from windows will be obscured by the scaffold during the installation process then a powerful source of lighting must be put in place at an acute angle to the surface to be finished. The surface of the Armourcoat Acoustic panels should be carefully inspected during and after sanding with this strong and acute cross light so that any imperfections or deviations in the surface can be addressed before the Armourcoat Acoustic Topcoat is applied to the surface.

The cross lighting must also remain in place whilst the Armourcoat Acoustic Topcoat is being applied.

## Surface protection

Where additional surface protection is required or in situations where the Armourcoat Acoustic Plaster System is likely to come into contact with water (e.g. swimming pool ceilings) we recommend the application of Armourcoat Armoursil Impregnator. Armourcoat Armoursil Impregnator is a solvent free, siloxane based water repellent impregnator for mineral based coatings.

## Ageing of the Armourcoat Acoustic plaster surface

The Armourcoat Acoustic Plaster System has fine pores in its topcoat and basecoat which allow the sound pressure waves to pass through these plaster layers so the sound energy can be attenuated in the mineral wool layer beneath the surface. Over the years microscopic particles of airborne dirt or dust can settle on the surface and lead to a slight greying of the surface. Under normal conditions this process is consistent across the entire surface and therefore not obvious or noticeable.

If the substrate is not airtight and air is being forced through the surface by a difference in air pressures or in areas where there is significantly more air flow (near air conditioning ducts, doorways etc.,) the surface of the plaster acts as a filter and this can lead to localised discolouration which will be visible. Alternative systems where the substrate is not completely airtight will age and discolour much more quickly.

## Cleaning, repair and restoration

The Armourcoat Acoustic Plaster System provides a natural mineral surface made primarily from finely bound grains of white marble. Whilst it is a resilient surface there is always a chance that over time it will be subject to damage or become soiled by airborne dust and dirt. Armourcoat offers a range of services to clean, repair or restore the surface finish.

### **Dust removal**

Areas which are subject to greater air movement (near air conditioning vents, doors etc.,) are likely to gradually pick up a small amount of airborne dust. This is best removed using a vacuum cleaner with a fine brush attachment.

### **Stain removal**

Any organic stains can be removed by the application of either a mild bleach or peroxide cleaner. Apply to the surface using a sponge or foam roller.

### **Scuff marks and surface marks**

Scuff marks and other dirty marks on the surface can often be easily removed using a white pencil eraser or an adhesive tape such as Selotape.

### **Damage repair**

Any repairs of damage to the surface should only be undertaken by Armourcoat Ltd or its partners who are familiar with using the material. It is possible to make minor repairs which are reasonably well disguised but larger repairs such as moving light fittings or access hatches will almost always result in a clearly visible patch repair.

### **Restoration**

There are circumstances where it is not possible to adequately repair or clean the surface fully due to age or the extent of the damage and it is therefore necessary to undertake a full restoration.

Fortunately it is possible to remove just the final topcoat plaster and reapply a new layer without the need to remove and reinstate the base panels. This will provide a brand new appearance without affecting the acoustical performance of the system.

## **Design detailing**

For all design details please see AP01 Armourcoat Acoustic Plaster System design details

### **General conditions and exclusions**

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