THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2022

Advanced Composite Materials Manual

JESMONITE® MADE FROM TE

FOREWORD

Any recommendations contained herein are intended only as a general guide and, before being used in connection with any report or specification, they shall be reviewed with regard to the full circumstances of such use.

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WHAT IS JESMONITE?

Jesmonite materials are a popular choice in the construction, architectural and art industries because of their versatility, durability, and lightweight properties. The materials are composite materials supplied in various forms, some made of a gypsum-based powder or alternatively a micro-cement and an acrylic polymer liquid, that, when mixed together, form a strong and flexible material that can be molded into various shapes and forms, exceeding the use scenarios of conventional materials.

Jesmonite was first developed in the early 1980s and since then, has become a staple material in the construction and creative industries alike. It is commonly used in the creation of architectural details, such as columns, cornices and moldings, due to its ability to mimic the look of traditional building materials such as stone, concrete and wood. Additionally, some Jesmonite materials are non-combustible, making them an ideal choice for fireproofing applications, such as fireproofing cladding, walls and ceilings.

In the fine arts, Jesmonite is widely used by sculptors, painters and artisans due to its versatility and ability to simulate natural materials. It can be easily molded and shaped to create a wide range of three-dimensional works of art, including sculptures, bas-reliefs and other decorative elements. Jesmonite is also prized for its ability to retain fine details, making it an ideal choice for creating highly detailed and intricate works of art.

Jesmonite is a highly durable material that is resistant to moisture, chemicals, and UV light. This makes it ideal for use in outdoor applications, as well as for use in environments where high levels of moisture and chemicals are present, such as in swimming pools and spas. Additionally, Jesmonite is able to be cast in lightweight and easy to handle formats, making it a popular choice for large-scale architectural projects, such as creating building facades, where weight restrictions are a consideration.

In conclusion, Jesmonite is a highly versatile, durable and lightweight material that is used in a wide range of applications in the construction, architectural and art industries. Its inherent ability to simulate natural materials and its versatility, strength and durability make it an ideal choice for a wide range of projects and design applications.

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CONTENTS

Foreword Page 2
What is Jesmonite? Page 3

AC100
- Technical Data Page 7
- Basic Casting Page 8
- Visual Casting Process Page 9
- Advanced Casting Introduction Includes: Page 10
- Visual Laminating Process Page 11
- Spraying & Vertical Application Page 12
- Colouring, Storage & Fixing Page 13
- Sealing & Colour Washing Page 14
- Additive Advice & Benefits Page 15
- Case Studies Pages 16 - 19

AC730
- Technical Data Page 21
- What is AC730?
- Overview
- Is AC730 GRC?
- Benefits
- Hardness
- Post Cure Treatments
- PPE
  Page 22
- Physcial Properties
- Tensile & Flexural Strengths
- Modulus of Elasticity
- Shrinkage & Moisture Movement
- Flexural Creep
- Permeability
- Moisture Absorption
- Fire Resistance
- Durability
  Page 23

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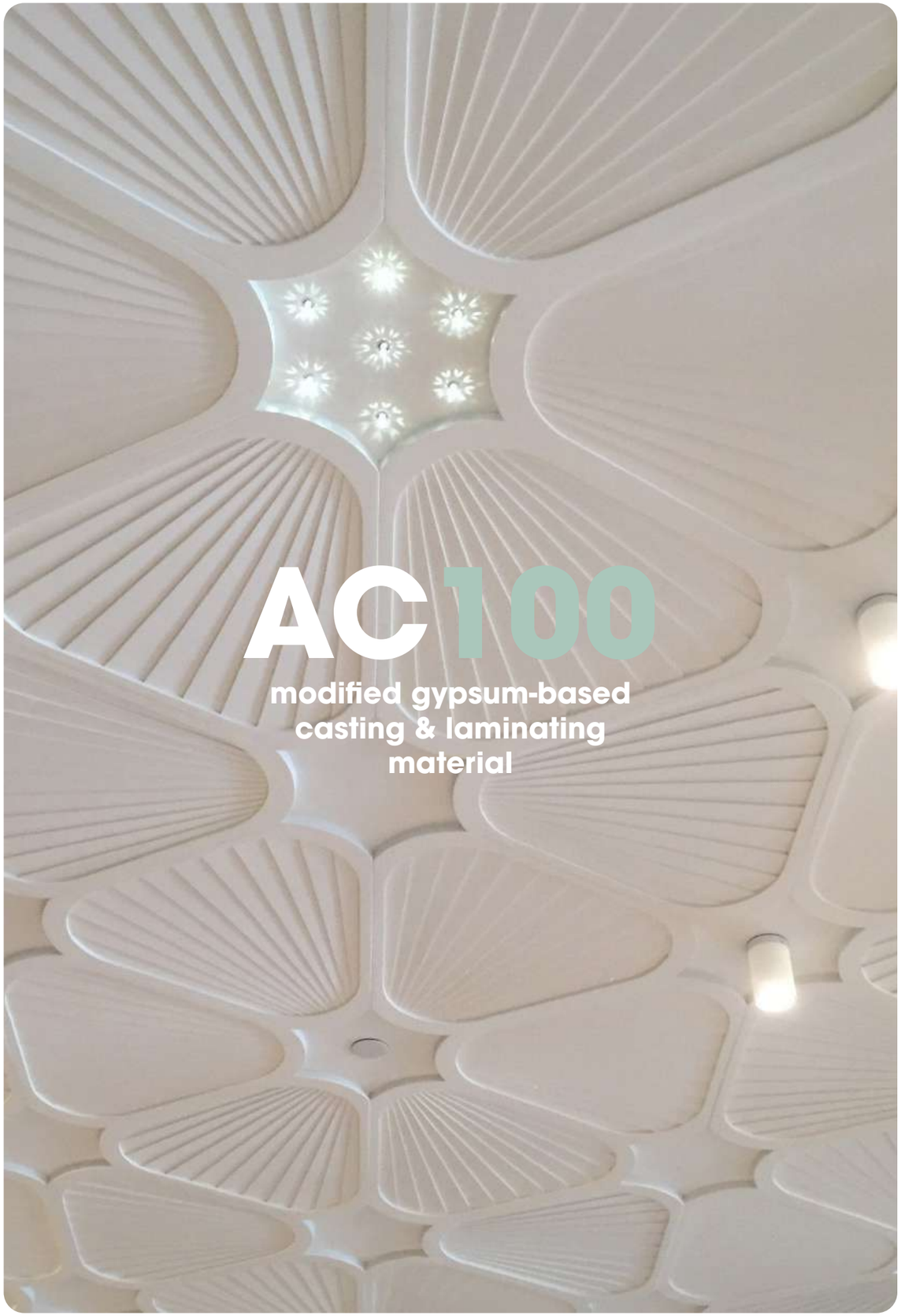
Advanced Composite Materials Manual
230615-revD-EW

AC730 Continued
- Specification Notes
- Panel Thickness
- Inspection & Maintenance
- Manufacturer Suggestions
  Page 24
- Typical Rainscreen Support Rail Detail Page 25
- Typical Traditional Support Fixing Detail Page 26
- AC730 Casting Methods
- AC730 Colour Chart Page 27
- Case Studies Pages 28 - 31

Flex Metal Gel Coats
- Technical Data Page 33
- Flex Metal Casting Page 34
- Visual Casting Process Page 35
- Flex Metal Colour Chart Page 36



AC100 - Technical Data

Product Description
Jesmonite® AC100 is a water-based, two-component, acrylic polymer/mineral resin system.

The system is suitable for a wide range of casting and laminating applications where the end user wants to reduce the many risks associated with conventional solvent based systems. A range of ancillary products including decorative and functional fillers, control chemicals, pigments and glass reinforcements are also provided making the material extremely versatile.

The material is suitable for internal use only, however, if used externally a sealer or suitable paint system is recommended to protect surface appearance.

Packaging
Liquids are supplied in 1kg, 5kg, 10kg, 20kg & 120kg canisters, Base in 5kg and 25kg Valve Sacks. Bulk IBC/FIBC supply available on request.

Food Safety
Jesmonite materials have not been tested for food safety.

Application Areas
Cast and laminated decorative mouldings, and with the inclusion of suitable glass reinforcements AC100 can be used for lightweight, high-impact panels. Jesmonite AC100 provides a fire resistant coating for many expanded foams for theme park and theatre props.

Key Attributes
Solvent free – No VOCs Good abrasion resistance and impact strength. High compressive and tensile strength. Rapid curing and high early strength gain.

Storage
For maximum efficacy products should be stored at a constant temperature of between 5 – 25°C. Keep clean, dry and away from any contaminents, powders should be kept in sealed containers. Freezing must be avoided.

Colour
AC100 is a natural material therefore is subject to potential variation between batches. To ensure colour control we recommend pigmenting batches.

Specification & Properties

Mix ratio	2.5:1 parts Base to Liquids by weight
Wet density	1845 kg/m^3
Dry density	1745 kg/m^3
Initial set	15 – 20 minutes (18°C, No Retarder)
Expansion	0.15%
Compressive strength	25 – 30 MPa
Tensile strength (UTS)	25 – 35 MPa
Bending elastic limit (LOP)	15 – 20 MPa
Bending strength (MOR)	50 – 65 MPa
Youngs Modulus	5 – 6 Mpa
Impact strength (Charpy)	30 KJ/m^2
Moisture movement	<1%
EN13501-1 Fire Classification	B-s1-d0
ASTM E84 Fire Classification	Class 1 (Class A)
Wet/Dry 50 cycles	Test specimens undamaged

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AC100 - Basic Casting

Mixing
Mixing AC100 can be done using a small wooden/silicone stirring stick for smaller batches, or a Jesmonite Higher Shear Mixing Blade for medium to large batches.

Best Practice
Although you may notice that the components blend together extremely quickly, we always suggest mixing for a few minutes at first a slow speed, and raising to a higher speed nearing the end of your mix - this ensures that all lumps are processed, leaving your mix smooth and lump-free and removing some of the potential for air bubbles occuring.

Working Time
Jesmonite AC100 has an open working time of 5-10 minutes once both componants are mixed. If you need longer working times you can dose the mix with Jesmonite AC Retarder to elongate the set time.

Note: In both colder and warmer weather you will notice lengthened and shortened set times respectively.

Curing Time
Jesmonite AC100 is a rapid setting material and is a water-borne product, therefore the moisture has to evaporate to cure the product correctly. Similar to the note above, the products overall curing time can vary dependant on the overarching weather conditions and external factors such as cast size, temperature and humidity.

We would suggest that you can see initial hardening times in as little as 5 minutes up to 30 minutes in colder conditions. Once the product has gained it's initial strength you can remove it from it's mould and rack it to finish curing, allowing the mould to be immediately re-used.

Avoiding Air Bubbles
Air bubbles can sometimes occur in casts, they can be problematic to repair in certain colours and locations, so ensuring that you are appropriately mixing, casting and vibrating the mould are all ways that will help eliminate these pesky bubbles.

Remember:
Mix well, brush in a base layer of Jesmonite where possible, tap and/or vibrate your mould to help push bubbles to the rear of the cast.

Colouration
Jesmonite AC100 is an off-white colour by default, however can be pigmented using a variety of methods, including, but not limited to:

- Jesmonite Official Liquid Pigments
- Paste Pigments
- Powder Pigments
- Acrylic Paints

Hardness
Jesmonite AC100 has an approximate hardness of 80 Shore D.

Post Cure Treatments
Jesmonite AC100 can be treated with Jesmonite Acrylic Sealer post-curing to provide best results and resistance against common stains.

PPE
Although Jesmonite materials are water-based, non-solvent products, we would suggest using gloves as a bare minimum to ensure your hands are kept clean.

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Step One
Weigh out Jesmonite Base.

Step Two
Weigh out Jesmonite AC100 Liquid.

Step Three
Mix Together (At the specified 2.5:1 Ratio).

Step Four
Add Desired Pigments & Fillers.

Step Five
Brush 1-2mm layer into mould for best results.

Step Six
Pour remaining mixture into mould.

Step Seven
Wait for product to cure then demould.

Step Eight
Seal, Sand & Admire your finished piece.

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AC100 - Advanced Laminating, Casting & Fixing Methodology

Laminating
Jesmonite AC100 has the unique ability to be cast extremely thin, thus lightening the overall cast, whilst retaining an extremely strong shell.

Laminating is a common choice for decorative features, sculptures and larger objects that contain a high level of detail but would be overly heavy if cast solid. Timing is essential when laminating an object as curing conditions may vary.

You can laminate into a mould using our Quadaxial Glass Mesh and/or Chopped Strands, a brush, roller or even a spatula for rounded objects and shapely sections.

Note: When casting your initial face-coat layer it is advised to thicken your mix by using Jesmonite Thixotrope, this will ensure that glass fibres are not making their way through the surface.

Empowering Creativity

Lamination gives users a host of ways to lighten their casts, achieve trickier details and further reinforce any cast creations.

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Step One
Clean and prepare mould where nessescary.

Step Two
Weigh and mix your base and liquid to ratio.

Step Three
Brush in and spread your base/first coat.

Step Four
Allow first layer to become touch dry and repeat if required.

Step Five
Wet with mix and apply Quadaxial Glass Fabric into touch dry coat.

Step Six
Optionally repeat process to further reinforce.

Step Seven
Optionally, create chopped strand reinforced premix and apply for further stability.

Step Eight
Finally, pour sufficient product into your mould to meet your desired level. Leave, then demould.

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Spraying

Similar to many conventional composite materials, Jesmonite AC100 can similarly be spray applied on to a variety of surfaces, including in to moulds and directly on to inert surfaces such as EPS (Expanded Polystyrene).

Spray application is a great way of covering large areas quickly, but also getting an even coverage on a large mould, especially when layering up in a laminated format.

For spraying the material we suggest utilising a gravity fed hopper spray spray gun where material can be loaded directly in to the top of the gun, it's important to ensure you have retarded your mix to the highest dose to avoid any premature setting or jamming in your gun.

AC100 can be sprayed through various nozzle sizes however smaller nozzles improve the direction of application greatly whilst removing overspray potential. (2mm is ideal).

Mix your material components as you would normally and simply load in to the spray gun as required, this operation sometimes demands two operators as it's most sensible to mix smaller batches to eliminate materials hardening in the bucket prior to spraying.

Vertical Application & Thickening

Some applications require a thicker variant of AC100, these include stopping material from sagging on higher sided moulds and also for stopping glass reinforcements from penetrating the surface.

For thickening AC100, AC200 & AC300 we recommend utilising Jesmonite Thixotrope, this additive can be added at the users preference to achieve a thickness that suits the project.

Thixotrope can also be used to turn the materials into a paste for post-cast repairs, or a mortar for joining two composites together.

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Preperation & Storage Practices

Every user has their own advice on best practices and ways of operating the materials, however a few best practices find their way on to every users list. Below are important to remember when using the materials:

- Always wash your mixing blade immediately after use to ensure it remains in best condition.
- Weigh out your liquid and powder seperately and add the powder to the liquid gradually whilst mixing for the best blend.
- Check your mould is clean and fit for use before mixing any materials. (if you have an airline it's worthwhile dusting down with a blast of air prior to use to remove any dust or residue)
- Store your materials in sealed containers between uses to elongate their lifespan and avoid any premature degredation from unintentional moisture.

Typical Fixing Methods

AC100 is typically fixed in scaled applications, by utilising mechanical fixings, these can be utilised in various manners, you can screw into AC100 however you should build-up dense areas with fibreglass refinforcement to reduce the potential for cracking when screwing. Mechanical fixings can also be adhesively fixed to the product to allow for hanging. Always consult an engineer when fixing large panels or fixing at height.

Adhesives are similarly useful for ensuring a seamless finish and also joining pieces of Jesmonite together to create various designs. For gluing two pieces of Jesmonite AC100 together we typically suggest two-part epoxy adhesives for best bonds, however if you're looking to adhere your finished product to the wall, in the form of a tile (or similar) we would suggest utilising a suitable flexible tile adhesive, this will ensure the piece is adhered but can accomodate movement within the supporting structure.

Colour Control

Jesmonite Pigments are designed for ultimate compatability with AC100 - 300, they are available in 10 standard colours and can be interemixed to create a bredth of different shades and tones to meet your exact requirements.

Colours are added at a maximum addition rate of 2% by weight of the total mix. However for lighter colours merely reduce the addition ratio to your desired colour is achieved. When added at maximum ratio expect to see a bold, saturated colour.

Note: Always ensure you are thoroughly shaking pigments prior to use, and storing them in appropriate ambient temperatures whilst frequently agitating to avoid seperation.

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Sealing

AC100 can be sealed using Jesmonite Acrylic Sealer which provides a degree of both stain and water resistance.

Acrylic Sealer can be applied using a variety of means, including, spraying, brush, roller or sponge.

We recommend for best results that two coats of Acrylic Sealer should be applied onto low porosity surfaces such as AC100, with the first coat being diluted with 10 – 20% water.

Diluting the first coat marginally aids the chemical bonding process of the Acrylic Sealer.

For best results and to ensure that you aren't seeing marks from the application tool, spraying Acrylic Sealer is the best method. Follow the above dilution ratio and spray through a gun, hand or pump spray bottle.

Colour Washing

Amongst the many benefits of Acrylic Sealer, it can also be diluted with water and pigmented using the Jesmonite Liquid Pigments to create colour washes to add a patina or to artificially age casts.

This allows the end-user to create another authentic layer of effects on the finished cast, ensure that you're allowing 24 hours between casting and applying a colour wash to a piece of Jesmonite.

AC100 Cast artificially aged using an Acrylic Sealer colour wash technique.

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Additive Advice & Addition Rates

Jesmonite Retarder

Jesmonite Retarder can be added to the pre-weighed liquids to extend the pot-life of the mixed material. Typical inclusion rates are between 2g–8g, however, a small test is recommended, as the precise timing is dependent on both temperature and mix size. 2% addition will make the set time approximately 25-30 minutes.

Jesmonite Thixotrope

Jesmonite Thixotrope is added to the mix to thicken the material to a 'Gel-Coat' consistency. This is useful when brushing or spraying materials onto moulds with vertical faces as it prevents the material from slumping.

Thixotrope should be added to the mix after the powders and liquids, and is best mixed using the High-shear Mixing Blade.

Add drop by drop until the desired consistency is achieved. Typical inclusion rates by weight are 2-6g per kilo of mixed material.

Chopped Glass Strands

Jesmonite Chopped Strands are compatible with AC100, AC200 & AC300 products - they are designed to add strength and long-term performance to thinner and more fragile items.

Chopped Strands are available in 6mm and 12mm formats and can be added to an AC100, AC200 or AC300 mix at a 3-5% ratio by weight of total mix.

We always recommend folding/mixing chopped glass strands in to a mix as opposed to using a mixing blade as a mixing blade can easily shred the strands therefore reducing their length and potentially degrading the total strength.

Chopped Glass Strands are ideal for creating a 'sandwich panel'.

Note: Chopped Glass Strands are not AR coated products therefore should not be used in conjunction with any cementacious Jesmonite materials (AC630, AC730, AC830).

Key Benefits

Lighter
Lighter than stone, concrete and traditional sand and cement products.

Stronger
Strong, flexible, and more durable, with an increased impact resistance.

Greener
Water-based making it kinder to the environment, solvent-free and no VOCs.

Finer
Replicates the very finest detail with superior weathering qualities.

Safer
Independently fire rated in accordance with European Fire Classification EN 13501-1.

Choice
Can be pigmented to any colour and also mimic any texture and reproduce the effect of materials such as stone, metal, wood,

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Case Study
Dubai Pavillion, 2020 Expo
2022

Manufacturer: Bahrain Al-Arabi International Decoration Co
Architecture: Santiago Calatrava
Contractor: Alec Contractors
Product: AC100

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Materials Manual
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Jesmonite has been the answer to a magnificent design which couldn't be executed originally as it was too heavy.

The lightweight nature of Jesmonite along with the ability to create a simplicity of texture helped establish the stunning UAE Pavilion at the Expo 2020 Dubai.

A hugely successful partner of Jesmonite played a key role in creating this jewel in the crown of the international event which attracted 20 million visitors.

Bahrain Al-Arabi International Decoration Co suggested Jesmonite to the architect, who had been unable to create 8.4m of priest panels for the wall cladding under the falcon-inspired feathered roof of the building as it was too heavy and accessibility was minimal.

The wall cladding under the 28 moveable wings that make up the roof of the building are made of 2,800 square metres of Jesmonite AC100 panels of an overall size of 8400mm x 2040mm.

Manufactures said it was a challenging project as it was difficult to achieve the simplicity and lack of lines on large size panels - which was an important aspect.

It is a one of a kind project which took two and half years to complete.

The building has received fantastic feedback and Al-Arabi has already been contacted by other contractors and companies looking to create similar designs.

Bosses said they were very proud of the special project, which echoes the importance of each project they create and has helped build an international reputation as a leader in the Middle East for designing and creating high profile contemporary, classical and Islamic gypsum works.

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Case Study
P&O Cruise Liner 'Britannia'
2015

Manufacturer: Feathercast
Architecture: Tom Tempest Radford
Client: P&O Cruises
Product: AC100

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Materials Manual
230615-revD-EW

Jesmonite AC100 has been used to make nearly 6,000 pieces of wall art on P&O's new cruise liner, Britannia.

All the cabins contain a triptych of cast Jesmonite panels, and Jesmonite also features in two of the ships main restaurants.

The cabin artwork was initially proposed in ceramic, however this presented problems in cost, speed of manufacture and weight.

Jesmonite panels were also used to create large relief panels for the Sindhu Restaurant and to mimic origami paper boats.

The Jesmonite solution was exactly what we needed given the strict fire rating and weight restrictions... and I am sure this will be a game changer for both the cruise and hotel industries".

Tom Tempest Radford - Curator
Tom Tempest Radford Limited

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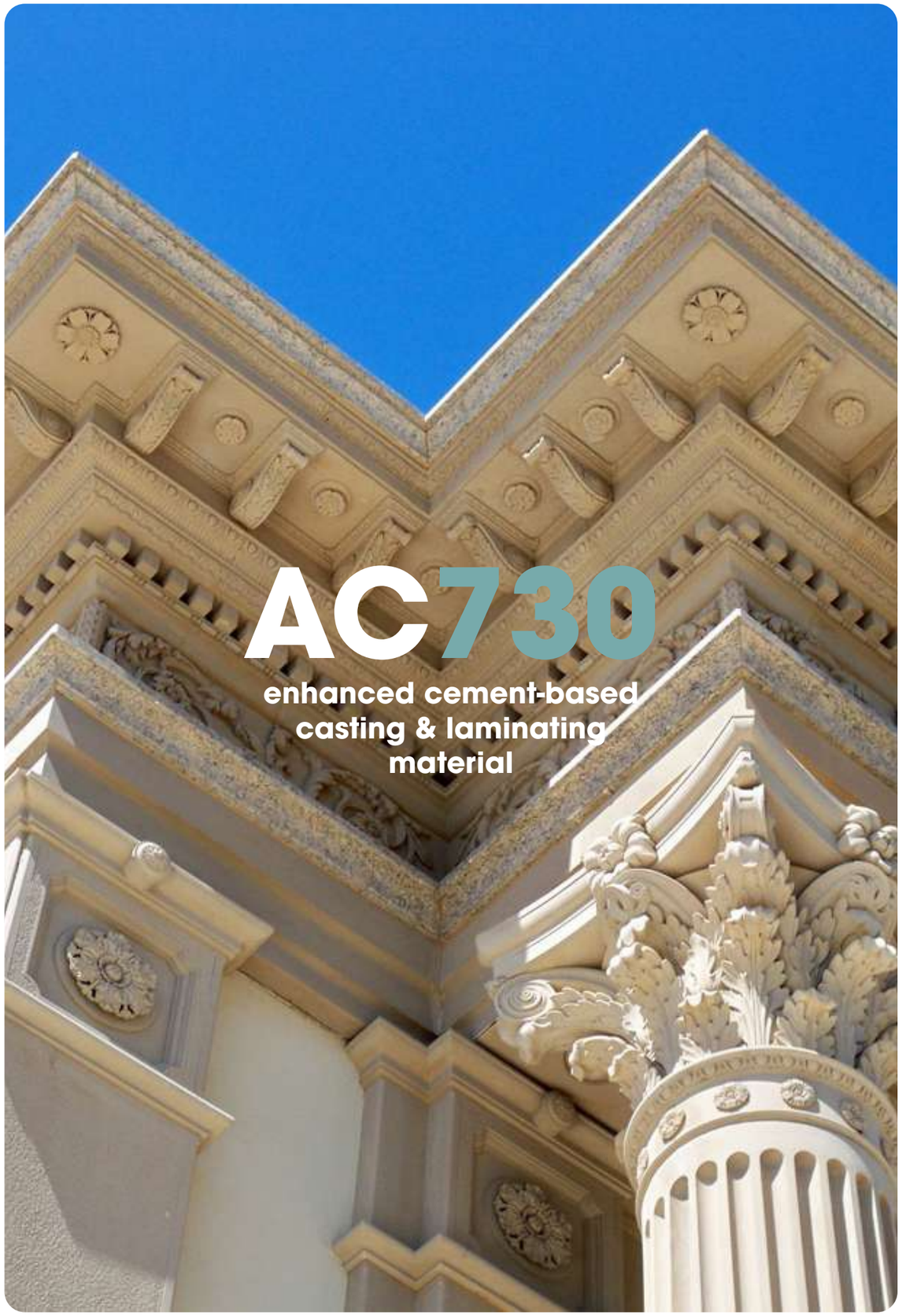

AC730 - Technical Data

Product Description
Jesmonite® AC730 is a rapid setting acrylic polymer modified cement-based composite. It is a shrinkage-compensated material of low permeability and is durable in all conditions of external weathering.

Reduced free-lime content, with low alkalinity, leading to major reductions in efflorescence in comparison with ordinary Portland cement systems. The product contains a fine decorative aggregate and powder pigments, carefully controlled to give a consistent decorative surface finish after treatment with a proprietary brick cleaner or acid etch.

It is supplied as two components, a waterbased acrylic liquid, and a blended Base.

Packaging
Liquids are supplied in 1kg, 5kg, 25kg containers and 1000kg Bulk IBC's, Base is supplied in 5kg and 25kg buckets and 1000kg FIBC's.

Food Safety
Not food safety tested.

Specification & Properties

Mix Ratio	5:1 (Base to Liquids)
Wet Density	1950 kg/m3
Dry Density	1850 kg/m3
Water Uptake/Porosity	2.26% (BS EN 1170-6)
Freeze-thaw Resistance	300 cycles (normal max 56 cycles)
Fire Classification	A2-s1-d0 (EN13501-1)
Dimensional Stability	Shrinkage = 0.83 Expansion = 1.28 (BS EN 1170-7)
Weathering/Durability	1008 Hrs (BS EN ISO 4982)
Compressive Strength	58Mpa (N/mm^2) (BS EN 12390-3)
Flexural Strength	LOP 8.9MPa – MOR 23.6MPa (BS EN 1170-5)

Application Areas
Glass reinforced decorative architectural mouldings, and small castings. Glass reinforcements such as Jesmonite AR Resistant Quadaxial Fabric or 13mm AR Chopped Strands can be utilised for lightweight, high-impact panels. It can also be used to create garden ornaments, statuary and is suitable for water features

Key Attributes
- Improved flexural strength and stability
- Excellent abrasion resistance and impact strength
- High compressive and tensile strength
- Rapid curing and high early strength gain
- Shrinkage compensated and dimensionally stable

Storage
For maximum efficacy products should be stored at a constant temperature of between 5 – 25°C. Keep clean and away from any contaminents. Freezing must be avoided.

Colour
Available in 11 standard colours covering a bredth of applications.

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What is AC730?

Overview
Jesmonite AC730 is a water based, rapid setting micro-concrete composite material. It is non-solvent, UV stable, externally durable, contains zero VOC's and achieves an A2-s1-d0 EN 13501-1 (non-combustible) Fire Classification. Jesmonite AC730 is a shrinkage compensated material of low permeability and has reduced free-lime content, with low alkalinity, leading to major reductions in efflorescence in comparison with ordinary Portland cement systems.

Jesmonite AC730 contains a blend of decorative aggregates and pigments to achieve a range of stone and concrete effect surface finishes.

The standard AC730 stone finishes are Natural Stone, Bath Stone, Yellow Sandstone, White Marble, Portland Stone, Silver Grey Granite, Old Terracotta and Charcoal Black. Jesmonite also offer a bespoke matching service to assist manufacturers, architects, and designers to match colour references.

Is it GRC? (Glass Reinforced Concrete)
Jesmonite AC730 is a proprietary polymer modified, glass fibre reinforced, cementitious composite which does not consist of a single composition, but can be manufactured using different combinations of materials to meet both technical and aesthetic requirements.

Mix compositions, method of compaction, type of cement and the proportion, length and orientation of the glass fibres, may all be varied to produce specific products. AC730 typically benefits from between 2-5% of glass fibres, combined with the cement/aggregate slurry and containing from 3-5% acrylic solids by weight on cement.

AC730 is typically referred to as a highly modified form of glass-reinforced cement (GRC) based on it's characteristics and uses.

Where can I use AC730?

AC730 is an extremely versatile product and can be used in a variety of envrionments and applications alike, including, but not limited to:

- Cladding Panels
- Decorative External Features
- Laminated Casts
- Glass Reinforced Solid Casts
- Internal Features & Homewares
- Non-Load Bearing Applications
- High Detail Artworks & Sculptures

Benefits
Jesmonite AC730 has a host of benefits when compared with conventional cement systems and GRC, the most significant are:

- Greater Strength to Weight Ratio
- Shrinkage Compensation
- BS & EN Conformance
- All Weather Durability
- Customisable Finishes
- Wide Colour Palette
- Major Effloresence Reduction

Hardness
Jesmonite AC730 can be reinforced to achieve any grade of strength, up to GRC Grade 18P.

Post Cure Treatments
AC730 can be treated with Jesmonite Pentrating or Flexiguard Sealer post-curing to provide best results and resistance against stains, external weathering and microbes.

PPE
Appropriate PPE should be worn as per the materials most current SDS sheet to ensure safety.

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Physcial Properties
Jesmonite AC730 slurry is highly workable, providing self-levelling properties for poured or laminated products. It's physical and mechanical properties depend heavily on the type of glass fibre, glass fibre content, polymer content and the quality of the mix. Manufacturing processes also influence this.

Tensile & Flexural Strengths
AC730 composites containing 3-5% polymer solids and 5% glass fibre subjected to flexural and tensile tests at 28 days provide a typical flexural strain capacity of 0.5 - 0.6% with an ultimate capacity of 0.25 - 0.35% after aging.

Modulus of Elasticity
Flexural stress strain values are used to determine the modulus elasticity. Typical values are 23.6 MPa after 28 days curing at 20°C and 65% relative humidity. Modulus of elasticity will vary in accordance with polymer content water/cement ratio and aggregate content.

Shrinkage & Moisture Movement
AC730 is no different to other cement-based materials in that all are subject to shrinkage during drying and partial recovery during re-wetting.
Typical values of irreversible shrinkage on hydration and first drying are 0.15 - 0.2%. Increasing the polymer content will decrease the shrinkage upon drying. Jesmonite AC730 composites are less sensitive to shrinkage cracking due to improved extensibility.

Flexural Creep
AC730 typical creep coefficient, after loading for one month was 1.0, increasing to 1.6 after 12 months.

Permeability
AC730 water vapour permeability is dependent upon its degree of porosity, which is influenced by the water cement ratio, polymer content, glass fibre content and age. A typical range is 8 -11 x 10 -10 m/s.

Moisture Absorption
Typical moisture absorption with 10% solids is 2-3% by weight after 21 days when tested to BS EN 1170-6 standards.

Fire Resistance
AC730 achieves an A2-s1-d0 EN 13501-1 Fire Classification.

Durability
AC730 Test Coupons have been subjected to durability testing. Accelerated weathering testing has subjected the material to temperatures ranging from minus 20°C to plus 70°C carried out in two tests.

Freeze /thaw Resistance: DD CEN/TS 12390-9
AC730 was tested for 300 cycles (normal maximum number of cycles is
56).

Very little if any scaling was found.

External Application & Specification Guidelines

Specification Notes

When specifying AC730 and any Jesmonite® external materials, it is important to consult with the appropriate parties prior to including product references within a specification.

Jesmonite® products aren't fabricated in specific standard sizes and are designed to project design and engineering specifications, therefore speaking to an Approved Jesmonite Manufacturer, Jesmonite Architectural Solutions or an appropriate engineer will help gauge the correct product and methodology for your project.

Furthermore, when you have recieved specifics on thickness, fixing method and panel grading, it is equally important to include these within your specification documentation and drawings to ensure that you are concisely specifying the product so that any awarded contractor can process the requirements.

Suggested Wording for Specification(s):

Jesmonite® AC730 Cladding Panel (15mm Overall Thickness) - Manufactured by Example Fabrications

Panel Thickness

Jesmonite® AC730 can be cast in a variety of formats, which include a variance in thickness dependant on strength, size and shape.

Naturally we have a nominal thickness that we recommend AC730 cladding panels being above, being 6mm. We believe that a minimum thickness of 6mm is sufficient to include a face coat, two layers of AR Quadaxial Glass Fabric and a premix chopped fibre reinforced layer.

Each manufacturer and engineer familiar with the product will have recommendations based on speicifc criteria so it is best to source perspectives prior to specification.

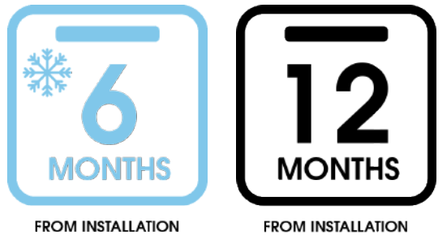
Generally panel thickness can range from 8mm - 25mm + dependant on requirements.

Panels should be designed by an accredited structural engineer.

Inspection & Maintenance

It is recommended that routine inspections are carried out on all installations to ensure adequate performance is being consistenty achieved in the field of application.

Suggested inspection times are listed below, if products are installed in colder conditions it is recommended for an inspection sooner.



Manufacturer Suggestions

With the inherent popularity of Jesmonite products, many manufacturers exist who have used the products to create various architectural and sculptural pieces - not all manufacturers are `Approved Jesmonite Manufacturers' however, therefore our suggestion is to ensure you're happy with your suggested manufacturers competence prior to undertaking a project.

All current `Approved Jesmonite Manufacturers' are listed on our website.

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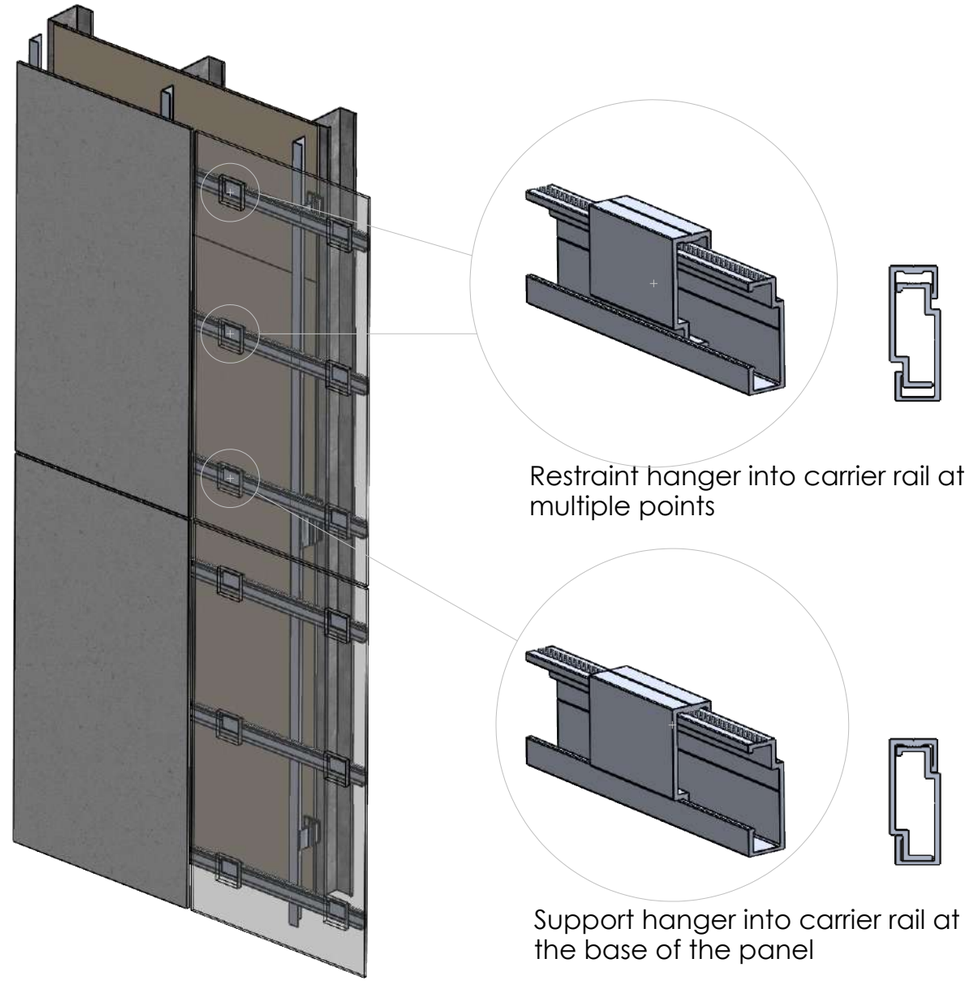
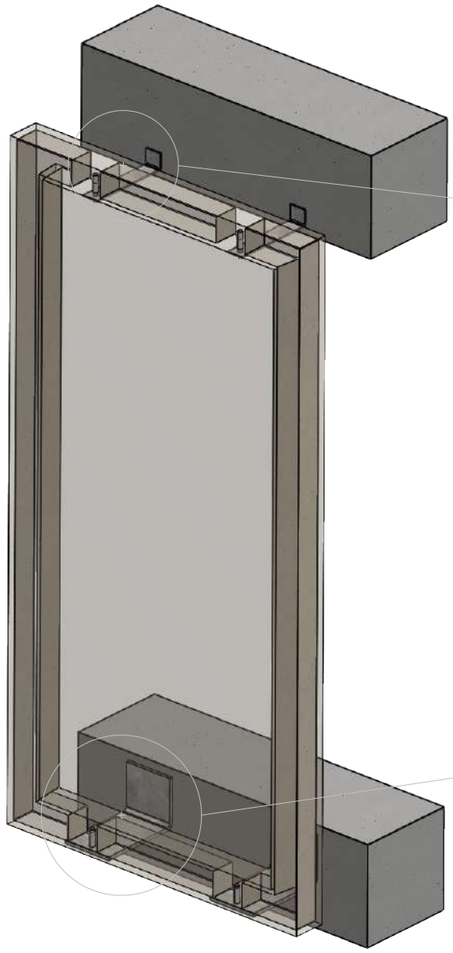
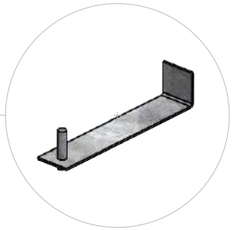
Typical Jesmonite® AC630 & AC730 Cladding Panel Rainscreen Support Rail Detail



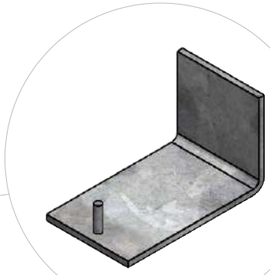
- Panel spans between fixing points typically 600mm centres.
- Lateral loads resisted by the frame with the panel spanning short distances.
- Panels deemed non-structural as they rely on the framing system for strength.
- Overall thickness of a typical panel between 15-30mm.

Typical Jesmonite® AC630 & AC730 Cladding Panel Traditional Support Fixing Detail





Restraint bracket located towards the top of the panel



Support bracket at the base of the panel

- Panel spans between fixing points.
- Lateral loads resisted by the panel and transferred to the brackets.
- Panels deemed structural and therefore requires reinforcing ribs to provide strength.
- Overall thickness of a typical panel at the ribs are between 80-125mm.

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Casting Methods

Overview
Jesmonite® AC730 is suitable for a variety of casting and general application methods, these are the same as those highlighted in the earlier sections of this document when showcasing AC100.

AC730 has some subtle differences when cast than its counterpart, AC100 therefore we have highlighted these below and outlined any key points to be aware of when utilising them for a variety of purposes.

Laminating
AC730 is a slower setting product when compared with AC100 therefore the user should adjust their timings respectively when layering glass into a mix. If laminating with AC630, AC730 or AC830 you MUST utilise an Alkali Resistant chopped glass fibre/strand or Quad/Tri/ Biaxial Mesh to ensure long-term performance.

Solid Casting
AC730 can be solid cast however the user should be aware of associated issues with thick, solid casting with AC730. The rapid exothermic reaction of the product can cause cracking and microfissuring when cast thick, this product should be cast at a maximum of 25/30mm, any thicker AC830 should be utilised.

Colour Chart

Bath Stone

Brick Red

Charcoal Black

Cotswold Honey

Marigold

Natural

Old Terracotta

Portland Stone

Silver Grey Granite

White Marble

Yellow Sandstone

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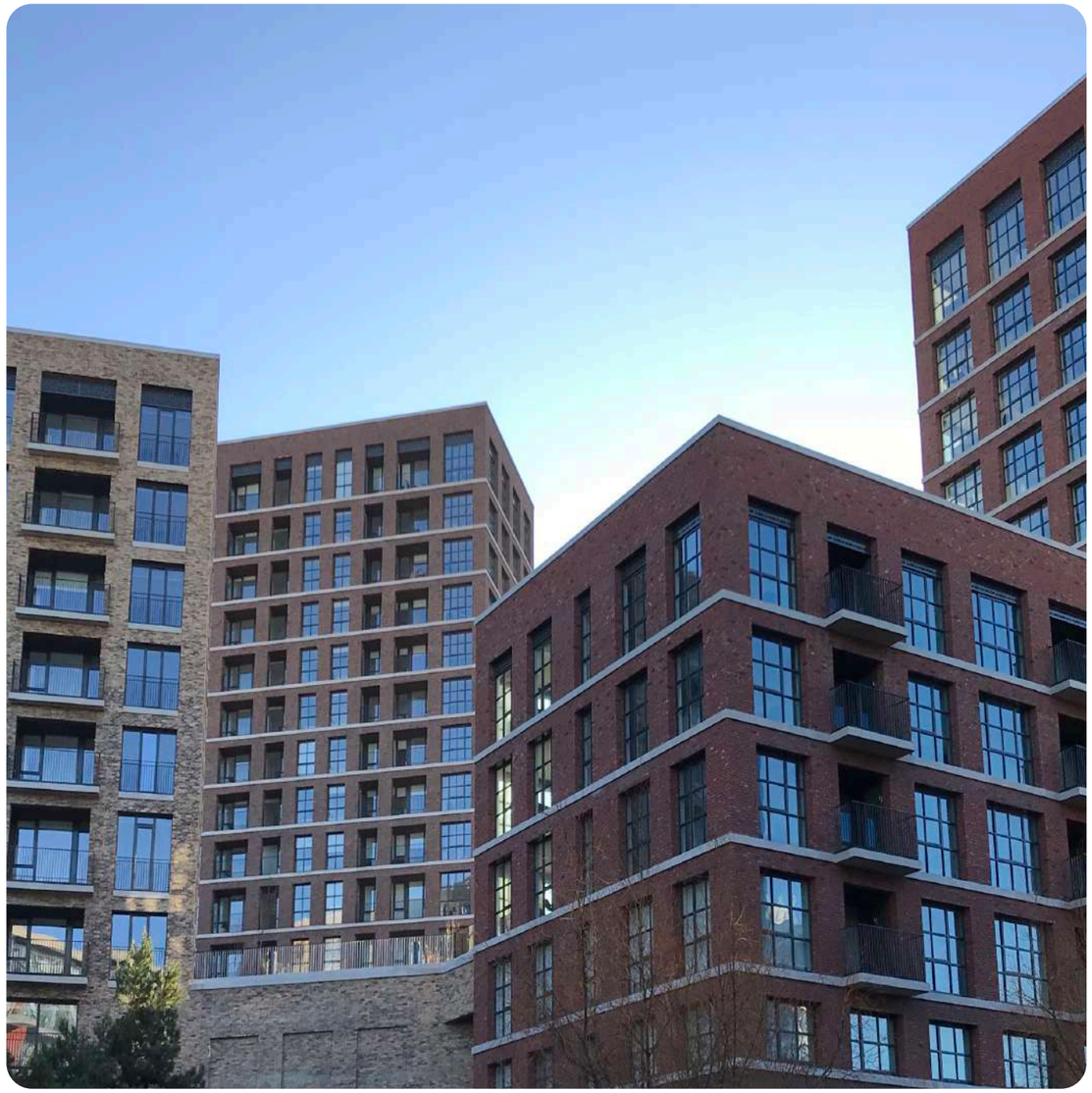
Case Study
Project Light, Canada Water
2019

Manufacturer: Simplicity Specialist Finishes
Architecture: StockWool
Contractor: Aardmore Construction
Product: AC730



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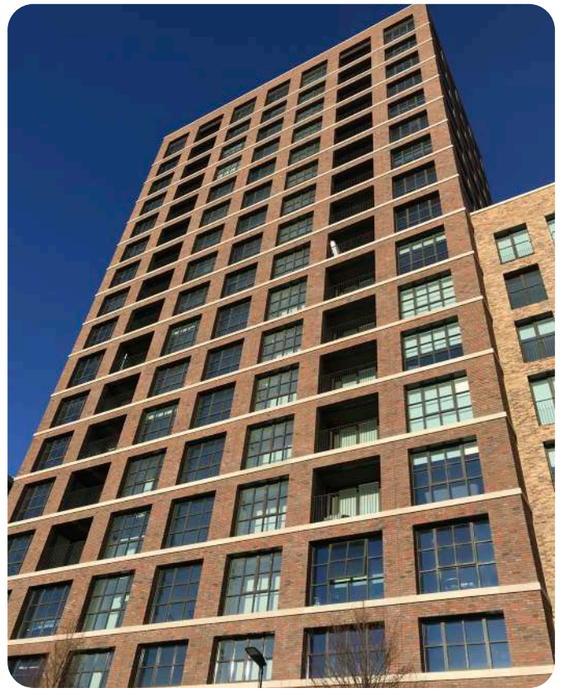
Project Light, Canada Water is a multi-phased dockside regeneration scheme in Southwark. It is a joint venture between Notting Hill Housing and Sellar Design & Development. The site is adjacent to Canada Water underground station and the dock, between London Bridge and Canary Wharf.

It includes 150,000sqft of retail and commercial space, including a cinema, bars, restaurants, office space and a 100,000sqft Decathlon store.

This is the largest Jesmonite cladding project to date, with approximately 9000m2 of Jesmonite AC730 external cladding panels specified as a lightweight alternative to traditional heavyweight concrete cladding.

Jesmonite Ltd worked closely with the building contractor Ardmore Construction and Jesmonite manufacturer Simplicity Specialist Finishes Ltd to devise a sustainable and fully integrated design solution.



Jesmonite Ltd created a bespoke AC730 colour match to achieve the clients desired colour scheme. Jesmonite is the ultimate chameleon material of the building industry, it can be used to replicate the appearance and texture of any surface finish in any number of colours.

The technology behind Jesmonite AC730 allows manufacturers to create large scale panels that offer major weight reductions whilst achieving high levels of impact resistance and flexibility, making Jesmonite AC730 the ideal material solution for external cladding panels.

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Case Study
Caesarea, Middle East
2015

Manufacturer: Stevensons of Norwich
Architecture: Cristiano Ferme
Client: Confidential
Product: AC730

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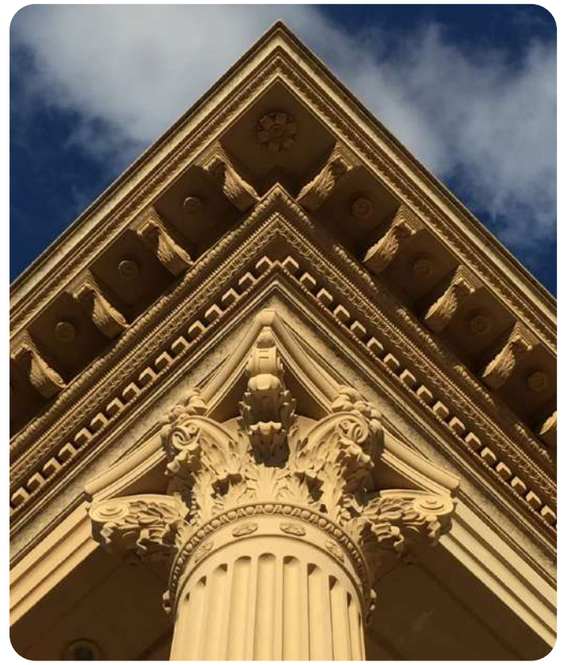
Jesmonite AC730 proved to be the ideal material solution for all of the decorative architectural elements on this magnificent private palace.

This included Corinthian columns, pilasters, cornices, friezes, balusters, window & door surrounds and other highly ornate features.

Jesmonite provided a bespoke colour match to the exacting requirements of both client and architect.

This has resulted in what may be considered to be the most refined and detailed work ever done in Jesmonite as is plainly demonstrated by these stunning project images.



“Jesmonite, when combined with our artistic and manufacturing skills, is the ideal material for delivering high definition, fine detail and the highest quality architectural mouldings.”

Stevensons of Norwich Limited
www.stevensons-stone.com

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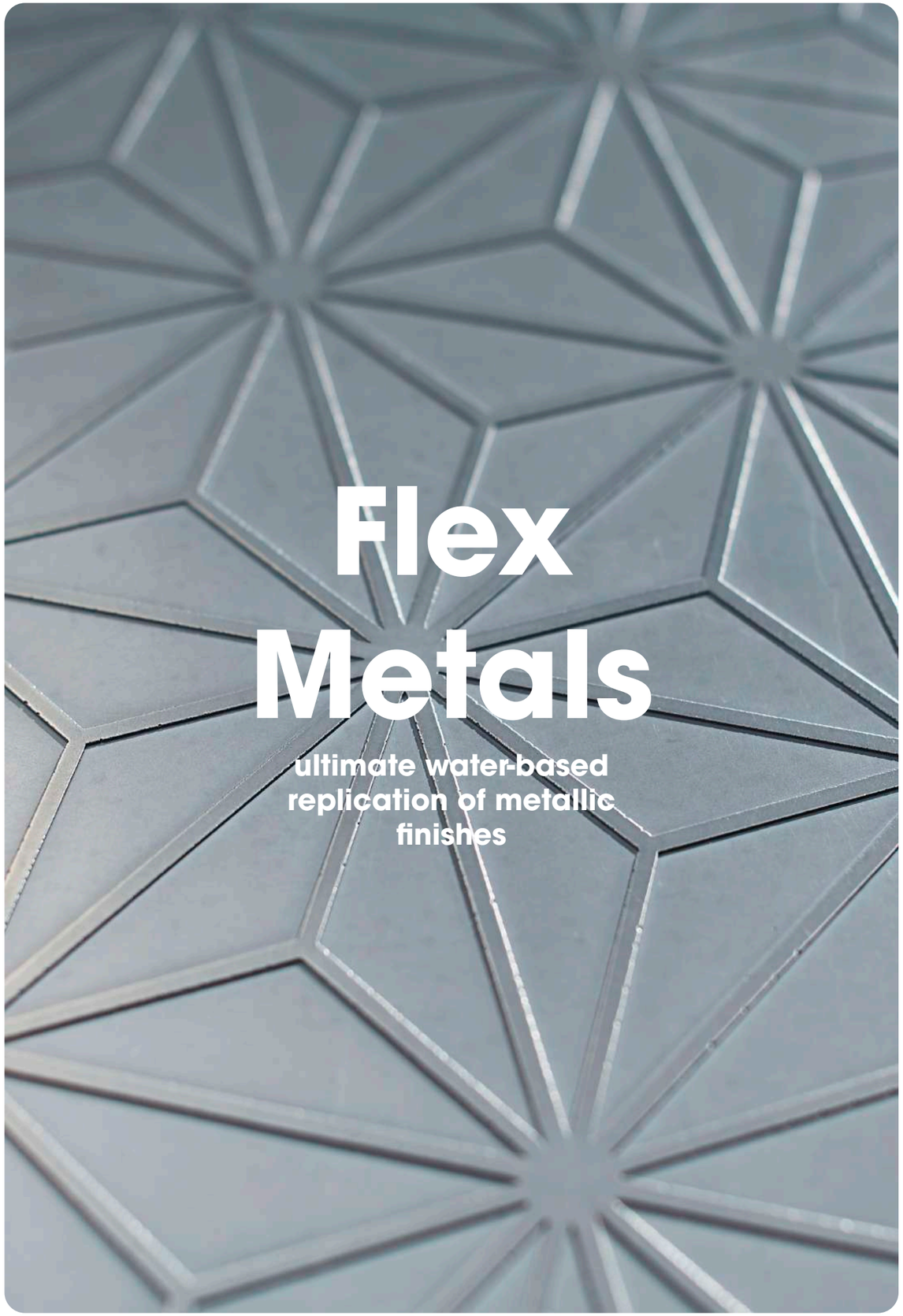

Flex Metal Gel Coats - Technical Data

Product Description
Jesmonite® AC730 Flex Metal Gel Coat is a rapid setting acrylic polymer modified cement based composite which incorporates real metal powder to achieve a range of metallic finishes.

It is designed to be brush applied into moulds with AC630, AC730 and AC830 composites being used as backing materials with suitable glass reinforcements.

Packaging
Liquids are supplied in 100g, 500g and 2kg jerry cans and Flex Metal Base is supplied in 550g, 2.75kg and 11kg buckets.

Key Attributes
- Real Metal Finishes
- Proven/Tested Material
- Rapid Curing
- Fast Initial Strength Gain
- Shrinkage Compensated
- Dimensionally Stable

Food Safety
Not food safety tested.

Colours
Available in 3 standard colours covering a multitude of metallic finishes.

Suggested Mix Ratios

Bronze Base

Flex Metal Bronze Base	5.5 parts by weight
Flex Metal Liquids	1 part by weight

Brass Base

Flex Metal Brass Base	5.5 parts by weight
Flex Metal Liquids	1 part by weight

Copper Base

Flex Metal Copper Base	7 parts by weight
Flex Metal Liquids	1 part by weight

Application Areas
Glass reinforced decorative architectural mouldings, cladding, and decorative castings. Glass reinforcements such as Jesmonite Quadaxial Fabric or 13mm Glass Chopped Strands can be utilised for lightweight, high-impact panels.

Noteworthy Properties
Weathering/Durability
ETAG 034 | 25 Years

Water Uptake/Porosity
BS EN 1170-6 | 2.26%

Freeze-Thaw Resistance
DD CEN/TS 12390-9 | 300 Cycles

Fire Resistance
EN13501-1 | B-s1-d0

Dimensional Stability
BS EN 1170-7 | S = 0.83 E = 1.28

Storage
For maximum efficacy products should be stored at a constant temperature of between 5 – 25°C. Keep clean and away from any contaminents. Freezing must be avoided.

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Flex Metal Casting

Preparation
It is essential to use both accurate scales and a Jesmonite High-shear Mixing Blade to ensure that the compound performs within its specification. Failure to follow these instructions can lead to strength loss, shrinkage, and reduced durability.

Workshop conditions should be warm, dry, and out of direct sunlight. Environments where solvent-based compounds are in regular use should be avoided. Mixing containers should be clean and dry, and of a suitable size.

Flex Metal Gel Coats will work best using Silicon Rubber moulds, however it is also possible to use Polyurethane moulding compounds with an appropriate spray release wax. Rigid GRP, wooden, plaster moulds are best avoided.

Mixing
Jesmonite Flex Metal Gel Coats must be mixed using a High-shear Mixing Blade. Attach this blade to a drill with variable speed control on the trigger and slowly add the Base to the Liquids whilst mixing continuously at low speed.

As the last powders are added, slowly increase the mix speed to around 1,000rpm and mix for a further 60 seconds or until the mix is smooth, flowing and free from lumps.

It is very important to keep the mix stirred whilst applying to stop any settlement of the heavy metal powders contained within the material.

Pigments
Flex Metal Liquids are compatible with our standard Jesmonite paste pigments. Colours should be added to the weighed liquids and mixed thoroughly before adding the powders. Flex Metal Gel Coats can be adjusted with small amounts of Jesmonite pigment to augment or adjust the background colour.

Mix Ratios
In general, the mixture can be adjusted to suit the application or needs of the user. Adding a little more liquid or base to make finer adjustments is very useful - however, always do small batch trials first to assess the materials suitability to a particular mould or application.

Surface Finish
Jesmonite Flex Metal Gel Coats are formulated to produce a metal finish. The finish can be achieved using a variety of polishing media, however we recommend '000' or fine grade steel wool. It is essential that the cast has cured for at least 24 hours, and that the surface has dried thoroughly.

Remove the surface by burnishing, until the desired metal effect is achieved. Whilst polishing, ensure that the dust is cleaned away constantly, and keep turning the wire wool as it wears.

Replace the wire wool as soon as it becomes worn. The surface should then be polished using a clean dry cotton cloth.

Curing
Objects should be kept in a warm, but not overly dry environment during this period. They should be racked to allow optimum air-flow, and stored in such a way that panels cannot 'creep' or bow under their own weight.

To accelerate final strengths casts can be placed in a warm room at around 40oC.

Finished products should be packaged only when cured. Care should also be taken when using plastic packaging, particularly in damp storage areas, as this can lead to surface staining and possible water marking.

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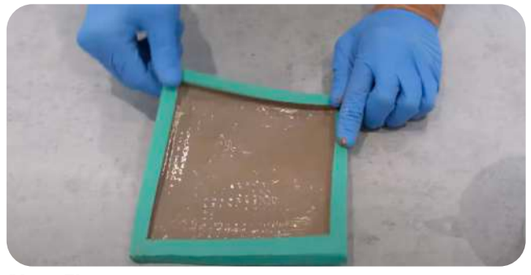
Step One
Weigh out Jesmonite Flex Metal Base.

Step Two
Weigh out Jesmonite Flex Metal Liquid.

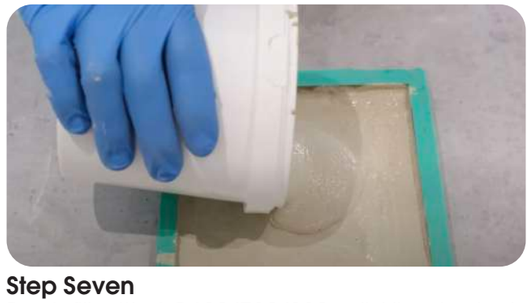
Step Three
Mix Together (At the specified ratio).

Step Four
Brush 1-2mm facing coat into your mould.



Step Five
Flex and vibrate your mould to release air.

Step Six
Leave product to become tacky, not dry.



Step Seven
Back-fill with AC630/730/830 solid/laminated.

Step Eight
Remove from your mould after 24 hours and leave, before polishing to show metal finish.

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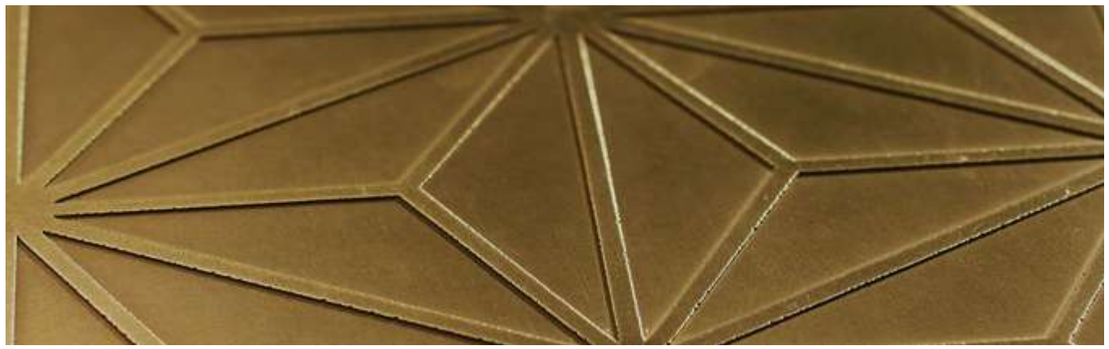
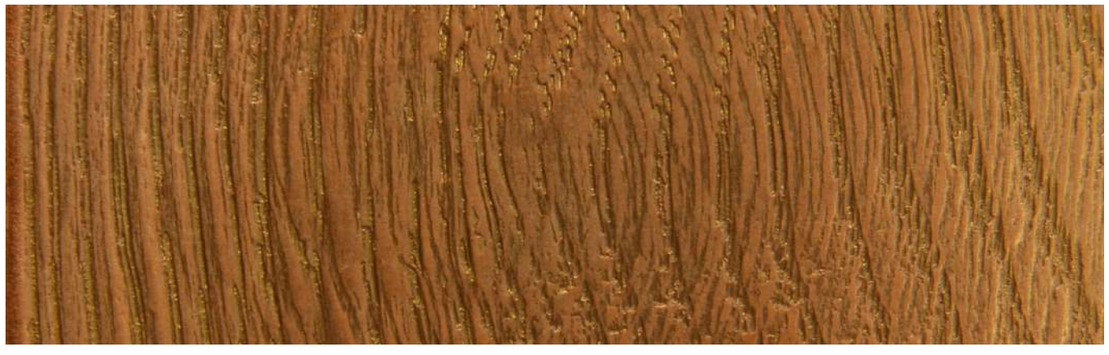
Flex Metals Colour Chart



Flex Metal Brass

Flex Metal Bronze



Flex Metal Copper

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