



MACRO-SYNTHETIC SINUSOID EMOSS FIBER

MACRO-SYNTHETIC FIBER SINUSOID EMOSS is the latest high performance macro-synthetic fiber developed from the innovative technology. MACRO-SYNTHETIC SINUSOID EMOSS has been specifically designed to satisfy the demanding requirements of modern day concrete and shotcrete reinforcement and equipment. Specifically engineered and manufactured in our ISO 9001:2008 certified facility for use as concrete reinforcement.

ADVANTAGES OF MACRO-SYNTHETIC SINUSOID EMOSS FIBERS:

- Requires no minimum amount of concrete cover
- Always positioned in compliance with codes
- Safe and easier to use than traditional reinforcement.
- Saves time
- Packaged for easy dosing into the concrete mix

FEATURES & BENEFITS

- Geometrically engineered to resist matrix pullout
- Increases flexural toughness
- Reduces rebound
- Increases cohesion and reduces segregation
- Increases impact and shatter resistance
- Non-magnetic
- Rustproof
- Chemically inert and alkali proof
- Reduced wear on concrete pumps and hoses
- Safe and easy to handle
- Simplified logistics
- Economical alternative to steel wire mesh and/or steel fibers

PRIMARY APPLICATIONS

- Sprayed concrete • Precast • Mining
- Tunnel linings • Channel Linings • Slope stabilization
- Slab on ground • Pavement • RCC • RCCP • Pavement Finisher Concrete

COMPLIANCE

- Complies with ASTM C 1116/C1116M Type III Fiber Reinforced Concrete
- Complies with ASTM D7508

- Complies with European Standard EN 14889-2: 2006 Fibres for Concrete Part 2: Class II and carries CE marking
- ISO 9001:2008 Quality Assured Facility

CHEMICAL AND PHYSICAL PROPERTIES

Absorption	<i>Nil</i>	Ignition Point	<i>404°C</i>
Acid & Salt Resistance	<i>High</i>	Melt Point	<i>160°C</i>
Alkali Resistance	<i>Alkali Proof</i>	Specific Gravity	<i>0.90 – 0.94</i>
Electrical Conductivity	<i>Low</i>	Thermal Conductivity	<i>Low</i>
Fiber Length*	<i>12-16- 38 – 52 mm</i>	Equivalent Diameter	<i>0.81 mm</i>

PRODUCT USE

MIXING: The specified dosage per m³ should be added to the mixer after batching the other concrete materials. After the addition of the fibers, the concrete should be mixed for sufficient time (batch plant: minimum 5 minutes or 70 revolutions) at full mixing speed to ensure uniform distribution of the fibers throughout the concrete mix.

PLACING: macro synthetic polyolefin fibers can be pumped, sprayed or placed using conventional equipment.

FINISHING: Conventional techniques and equipment can be used when finishing macro synthetic fiber concrete.

APPLICATION RATE: The application rate for macro-synthetic fibers will vary depending on the application, mix design and the toughness requirements of each particular project Typically, macro synthetic fibers dosage will be in the range of 1.5 kg/m³ to 8 kg/m³) of concrete. When used in conjunction with Fibermesh 150 fibers our fibrillated Mesh the dosage rate and the performance of the sprayed concrete can be optimized economically.

Macro synthetic fibers are compatible with all concrete admixtures and performance enhancing chemicals.

SAFETY

No special handling is required with macro synthetic fibers. Full Safety Data Sheets are available upon request.

PACKAGING

Macro synthetic fibers are collated in degradable water soluble wrapped bundles (pucks), packaged in a range of box weights from 7 to 10 kg. Other packaging options are available such as bulk bags. Store materials in a cool dry place. Do not store in direct sunlight.

REFERENCE DOCUMENTS

ACI 304 Guide for Measuring, Mixing, Transporting and Placing Concrete

ACI 506 Guide for Shotcrete

ASTM C1116/C1116M Standard Specification for Fiber- Reinforced Concrete and Shotcrete

ASTM C 1436 Standard Specification for Materials for Shotcrete

ASTM C 1550 Standard Test Method for Flexural Toughness of Fiber Reinforced Concrete (Using Centrally Loaded Round Panel)

ASTM C 1609 /C 1609M Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading).

Concrete Society (UK) Technical Report 65 Guidance on the use of Macro-synthetic Fibre Reinforced Concrete
Concrete Society (UK) Technical Report 66 External In-situ Concrete Paving
EFNARC European Specification for Sprayed Concrete
European Standard EN 14889-2: 2006 Fibres for Concrete

SPECIFICATION CLAUSE

Fibers for concrete shall be macro synthetic polyolefin high performance macro-monofilament fiber conforming to ASTM C1116 Type III and manufactured specifically for the reinforcement of concrete or Fibers for concrete shall be macro synthetic polyolefin high performance macro-monofilament fiber conforming to EN14889-2: 2006 Class II and manufactured specifically for the reinforcement of concrete .

The fibers shall be manufactured in an ISO 9001:2008 certified manufacturing facility. Unless otherwise stated, macro-synthetic fibers shall be mixed at the batch plant, at the recommended rate of.... kgs/m³, and mixed for sufficient time (minimum 5 minutes) to ensure uniform distribution of the fibers throughout the concrete mix..



MACRO-SYNTHETIC SINUSOID FIBER

MACRO-SYNTHETIC SINUSOID FIBER is the latest high performance macro-synthetic fiber developed from the innovative HPP technology. MACRO-SYNTHETIC SINUSOID FIBER has been specifically designed to reinforce a concrete slab on grade with great finishing characteristics. Specifically engineered and manufactured in our ISO 9001:2008 certified facility for use as concrete reinforcement.

ADVANTAGES OF MIRAGE FIBERS:

- Non-magnetic
- Rustproof
- Alkali proof
- Requires no minimum amount of concrete cover
- Always positioned in compliance with codes
- Safe and easier to use than traditional reinforcement.
- Saves time
- Packaged for easy dosing into the concrete mix
- Fiber engineered for improved finishing characteristics over other macro synthetic fibers

FEATURES & BENEFITS

- Geometrically engineered to resist matrix pullout
- Increases flexural toughness
- Increases cohesion and reduces segregation
- Increases impact and shatter resistance
- Non-magnetic
- Rustproof
- Chemically inert and alkali proof
- Reduced wear on concrete pumps and hoses
- Safe and easy to handle
- Simplified logistics
- Economical alternative to steel wire mesh and/or steel fibers

PRIMARY APPLICATIONS

- Slab on ground
- Precast
- Pavement

COMPLIANCE

- Complies with ASTM C 1116/C1116M Type III Fiber Reinforced Concrete

- Complies with ASTM D7508
- Complies with European Standard EN 14889-2: 2006 Fibres for Concrete Part 2: Class II
- ISO 9001:2008 Quality Assured Facility

CHEMICAL AND PHYSICAL PROPERTIES

Absorption	<i>Nil</i>	Ignition Point	<i>404°C</i>
Acid & Salt Resistance	<i>High</i>	Melt Point	<i>160°C</i>
Alkali Resistance	<i>Alkali Proof</i>	Specific Gravity	<i>0.91</i>
Electrical Conductivity	<i>Low</i>	Thermal Conductivity	<i>Low</i>
Fiber Length*	<i>12-16- 38 – 52 mm</i>	Equivalent Diameter	<i>0.79 mm</i>

PRODUCT USE

MIXING: The specified dosage per m³ or yd³ should be added to the mixer after batching the other concrete materials. After the addition of the fibers, the concrete should be mixed for sufficient time (batch plant: minimum 5 minutes or 70 revolutions) at full mixing speed to ensure uniform distribution of the fibers throughout the concrete mix.

PLACING: macro synthetic polyolefin fibers can be pumped, sprayed or placed using conventional equipment.

FINISHING: Conventional techniques and equipment can be used when finishing macro synthetic fiber concrete.

APPLICATION RATE: The application rate for macro-synthetic fibers will vary depending on the application, mix design and the toughness requirements of each particular project macro synthetic fiber will have a minimum dosage of 3 pcy (1.8 kg/m³) in concrete.

COMPATIBILITY

Macro synthetic fibers are compatible with all concrete admixtures and performance enhancing chemicals.

SAFETY

No special handling is required with Macro synthetic fibers. Full Safety Data Sheets are available upon request.

PACKAGING

Macro synthetic fibers are collated in degradable water soluble wrapped bundles (pucks), packaged in a range of box weights. Other packaging options are available such as bulk bags. Store materials in a cool dry place. Do not store in direct sunlight.

REFERENCE DOCUMENTS

ACI 304 Guide for Measuring, Mixing, Transporting and Placing Concrete

ASTM C1116/C1116M Standard Specification for Fiber-Reinforced Concrete and Shotcrete

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SPECIFICATION CLAUSE

Fibers for concrete shall be macro synthetic polyolefin high performance macro-monofilament fiber conforming to ASTM C1116 Type III and manufactured specifically for the reinforcement of concrete

or

Fibers for concrete shall be macro synthetic polyolefin high performance macro-monofilament fiber conforming to EN14889-2: 2006 Class II and manufactured specifically for the reinforcement of concrete

The fibers shall be manufactured in an ISO 9001:2008 certified manufacturing facility. Unless otherwise stated, macro-synthetic fibers shall be mixed at the batch plant, at the recommended rate of ... lbs/yd³ (... kgs/m³), and mixed for sufficient time (minimum 5 minutes) to ensure uniform distribution of the fibers throughout the concrete mix.

HIGH PERFORMANCE FIBRE REINFORCED CONCRETE

Bespoke concrete design solutions for both internal and external floor slab applications. High performance concrete incorporating a 3-Dimensional system of either macro-synthetic or steel fibre reinforcement, which reduces the risk of cracking, increases impact/ shatter resistance, improves surface durability and reduces long-term maintenance costs.

Sirjan Advanced Design is a tailor made fibre reinforced concrete to suit specific customer needs and manufactured in accordance with BS EN ISO 9001, BES 6001 and BS EN 14889. It is independently certified under the Quality Scheme for Ready Mixed Concrete (QSRMC) in accordance with the relevant standards. Fibre reinforcement is added to the concrete at the Sirjan Co. batching plant at the precise dosage specified within our Advanced Design solution. The concrete arrives on site with the fibres evenly distributed throughout, and the process of placing concrete and reinforcement is completed in a single operation. Advanced Design is a high performance fibre reinforced concrete which replaces the need for conventional steel wire fabric, eliminating misplaced reinforcement.

Applications

- » Internal and external ground supported slabs
- » Heavy duty floors with high abrasion risk
- » Re-cycling plants
- » Large plant and machinery yards
- » Docks and maritime facilities
- » RCC
- »RCCP
- »Pavement Finisher Concrete

Key features and benefits

- » The need for traditional mesh in the floor slab is removed
- » Concrete and reinforcement is delivered as one
- » No wastage on site as the concrete contains the prescribed amount of fibres
- » Reinforcement is always placed in the correct position
- » Health & safety risks associated with cutting/placing steel are removed

Design Information

- » All designs follow good industry practice and adopt the guidance from independently published documents.
- » Full calculations are available upon request. These will allow engineers full sight of the design principles adopted and to verify any proposed solution.
- » Designs will be tailored to meet specific project requirements. This will then allow the floor thickness and joint spacing to be optimised where appropriate.
- » Assistance with jointing layout and details can be provided to meet both the design and construction requirements.
- » A minimum CBR of 5% is required for all ground conditions. Where high values are achieved, then the design will be optimised to reflect this.
- » Further advice can be given on potential jointing solutions and detail dependent on the specific design solution and preferred method of construction.
- » Designs are by qualified engineers with a wealth of experience in fibre reinforced concrete.

Installation

Sirjan Advanced Design has no special handling requirements and can be placed using conventional techniques such as direct discharge, skip or pump.

Placement and finishing guidelines are available upon request.

Good construction practices should be adhered to at all times.

These include: well prepared and compacted sub-base; correct positioning of contraction joints; sawn Induced contraction joints being formed as soon as possible after concrete placement; attention to slab detailing where shrinkage restraint is unavoidable e.g. re-entrant corners, columns and slab thickenings and application of suitable curing membrane to avoid excessive early moisture loss.

Economical Benefits

Using Sirjan Design can lead to significant cost reductions by way of: optimized slab thickness; reduced labour;

elimination of crane/lifting for reinforcement; faster construction and lower maintenance.

Sirjan Advanced Design is easier and quicker to place than steel mesh reinforced concrete. The Health and Safety hazards associated with handling and placing steel mesh are also significantly reduced.

Lower Carbon Emissions

Sirjan provides high-performance, innovative cementitious solutions for customers' evolving needs.

As part of our core strategy, we use sustainable construction practices and products that help society meet green growth goals. When macro-synthetic fibres are incorporated within the Advanced Design they reduce the overall carbon footprint of the reinforced concrete composite by around 50% (when compared with the use of traditional steel mesh reinforcement).

Warranty

A comprehensive warranty is available on request which guarantees the performance of CEMEX Advanced Design when placed in accordance with the accepted guidelines/ practices and is not subjected to loads in excess of the design assumptions.

Health and Safety

Contact with wet concrete may cause irritation, dermatitis or severe alkali burns. There is a serious risk of damage to the eyes. Wear suitable waterproof protective clothing, gloves eyes/face protection. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. After contact with skin, wash immediately with plenty of clean water. Keep out of reach of children.

Contains Chromium (VI), may cause allergic reaction.



Concrete Solutions Datasheet

POLYPROPYLENE FIBRE CONCRETE

With Sirjan Fiber you can be assured of getting the best range of concrete solutions, specifically designed to high specifications for various end uses. Polypropylene Fibre Concrete is versatile and can be used in most applications. Polypropylene fibre (short-cut strands of very fine denier monofilament*) is added to the concrete during batching. Thousands of individual fibres are then evenly dispersed throughout the concrete during the mixing process creating a matrix-like structure.

*fibrillated fibres can also be supplied on request.

Applications

- Most small builder, cash sales and DIY applications
- Internal floor-slabs (retail stores, warehouses, etc.)
- External slabs (driveways, yards, etc.)
- Agricultural applications
- Roads, pavements, driveways, kerbs
- Shotcrete; thin section walling
- Overlays, patch repair
- Water retaining structures, marine applications
- Security applications such as safes and strongrooms
- Deep lift walls

Features and Benefits

Plastic state advantages

The addition of fibres helps to maximise the intrinsic early strength of the concrete and specifically:

Feature	Benefits
Improves concrete's resistance to plastic shrinkage cracking.	Reduced frequency of plastic cracking.
Inhibits formation of micro-cracks due to dimensional change.	Improved durability and reduced permeability.
Reduces sedimentation.	Decreases risk of plastic settlement cracking over re-bar.

NOTE:

Polypropylene fibres actually help inhibit the formation of cracks in concrete, whereas steel mesh only has functional value after the concrete has cracked.

Other fibre concrete available from Sirjan Co:

- Advanced Polypropylene Fibre Concrete • Steel Fibre Concrete

Features and Benefits (continued)

Working improvements

Polypropylene fibres offer many installation advantages, enabling a better job to be achieved in less time:

Feature	Benefits
Increased cohesion of the mix.	Reduced settlement. Easier finishing.
No requirement for crack control steel mesh.	No need to purchase and store additional material. No delays to fast track schedule. Easier positioning of joints.
Concrete placement and crack control in ONE operation.	Reduced site labour requirement. No secondary steel mesh is required and reinforcement is automatically positioned.
Reduced bleeding.	Easier finishing of the concrete surface.
Less expensive (per m ²) than conventional steel mesh reinforcement.	Reduced project costs.

NOTES:

1. Effective protection and curing is essential for all concrete slabs - including polypropylene fibre concrete.
2. Polypropylene fibre concrete CANNOT be used as a substitute for structural steel reinforcement.

Final concrete performance

The effects of polypropylene fibre concrete in its plastic state lead to other advantages in its hardened state:

Feature	Benefits
Reduced plastic cracking means a reduction in surface permeability.	Enhanced durability.
Bleed water control inhibits migration of cement fines and sand to the surface.	Harder, more durable surface with better abrasion resistance.
Even distribution of fibres throughout the concrete.	Improved flexural properties. Increased resistance to spalling at higher temperatures and so.... better fire resistance.
A tougher surface with fewer bleed holes.	Reduced absorption of water, chemicals and dirt.

Cost benefit analysis

- Cost savings in secondary reinforcement steel mesh for ground supported slabs
- Faster construction (removes the need to lay mesh and spacers etc.)

Health and Safety

Contact with concrete may cause irritation, dermatitis or severe alkali burns. There is serious risk of damage to the eyes. Wear suitable waterproof protective clothing, gloves and eye/face protection. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. After contact with skin, wash immediately with plenty

of clean water. Keep out of reach of children. Contains Chromium (VI), may cause allergic reaction.



Concrete Solutions Datasheet

ADVANCED POLYPROPYLENE FIBRE CONCRETE

With Sirjan Fiber you can be assured of getting the best range of concrete solutions, specifically designed to high specifications for various end uses.

Advanced Polypropylene Fibre Concrete is a pioneering combination of fine and coarse monofilament polypropylene fibres which takes concrete fibre reinforcement to a new level of performance.

The introduction of deformed coarse fibres into the concrete mix allows much higher dosage rates, resulting in increased toughness and ductility of hardened concrete.

Applications

- Internal floors (retail stores, warehouses etc.) including heavy industrial floors
- External slabs (pavements & hard standings)
- Roads & bridges
- Airport taxiways

Features and Benefits

Hardened state advantages

Feature	Benefits
Increases flexural toughness / residual strength.	Increased load bearing capacity of concrete. Potential reduction of concrete slab depth.
Provides post-crack performance.	Concrete retains load carrying capability after cracking has occurred.
Increased impact and abrasion resistance.	Increased durability and reduced maintenance costs.

Plastic state advantages

Feature	Benefits
Improves concrete's resistance to plastic shrinkage cracking.	Reduced frequency of plastic cracking.
Inhibits formation of micro-cracks due to dimensional change.	Improved durability and reduced permeability.
Reduces sedimentation.	Decreases risk of plastic settlement cracking over re-bar.

Other fibre concrete available from Sirjan Co:

- Polypropylene Fibre Concrete • Steel Fibre Concrete

Features and Benefits (continued)
Working improvements

Feature	Benefits
Increased cohesion of the mix.	Reduced settlement.
No requirement for crack control steel mesh.	No need to purchase and store additional material. No delays to fast track schedule. Easier positioning of joints.
Concrete placement and crack control in ONE operation.	Reduced site labour requirement for on-site handling and cutting of steel reinforcement. No secondary steel mesh is required and reinforcement is automatically positioned.
Reduced bleeding.	Easier finishing of the concrete surface.
Cost effective alternative to conventional steel mesh reinforcement.	Reduced project costs.

NOTES:

1. Effective protection and curing is essential for all concrete slabs - including high strength polypropylene fibre concrete.

Final concrete performance

Feature	Benefits
Reduced plastic cracking means a reduction in surface permeability.	Enhanced durability.
Controls cracking which occurs in the hardened state.	Enhanced load bearing capability.
Bleed water control inhibits migration of cement fines and sand to the surface.	Harder, more durable surface with better abrasion resistance.
Even distribution of fibres throughout the concrete.	Improved flexural properties.
A tougher surface with fewer bleed holes.	Reduced absorption of water, chemicals etc.

Cost benefit analysis

- Cost savings in secondary reinforcement steel mesh for ground supported slabs
- Faster construction (removes the need to lay mesh and spacers etc.)

Health and Safety

Contact with concrete may cause irritation, dermatitis or severe alkali burns. There is serious risk of damage to the eyes. Wear suitable waterproof protective clothing, gloves and eye/face protection. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. After contact with skin, wash immediately with plenty of clean water. Keep out of reach of children. Contains Chromium (VI), may cause allergic reaction.