Dual Shrinkage Micro Concrete, Cement + Silica Fume Base, Repair Mortar for without Formwork System

Non-Shrinkages Compensated	**< 0.025 [%]**
Chloride Permeability	**< 0.03 [x 10^{-9} cm^2/s]**
Sulfate Expansion	**< 0.003 [%]**

Characteristics

Cem MicroFume, is a partially non-shrink & high flowing, pre-bagged premixed ready to use cementitious concrete grout for general repair civil engineering works, and large volume quantity with single apply placing on excess 25-300mm thickness, it's provides extended working life & high early strengths.

Due to its new formulation, **Cem MicroFume** product is based on selected high grade of Silica Fume (Microsilica is Pozzolanic), Wearing Course Mineral, Original Portland Cement Type II & Rheological Additives. For better workability of smoother, controlled expansion at bolt plastic and hardened, excellent for pumping, & stabilized air voids.

Features

* Protection Resistance to Acids
* Protection Sulfate Resistance
* Protection Chloride Resistance
* Protection Frost Resistance
* Protection Sea Water Permeability
* Protection Alkali-Silica Reaction
* Non-Shrinkage
* Excellent Wetting & Thermal Expansion
* No Bleeding
* Dense & Durable
* High Early Strength
* Better Workability
* Electrical Resistivity
* Better Flowing
* Non-Toxic & Non Corrosive
* Better Impact & Vibration

Uses

Cem MicroFume is suitable for all types of structural repair elements.

*	Jetty or Marine House	- Pile Quay Pillars, Slab, Column & Beam
*	Tunnel or Bridge	- Slab, Wall, Column & Beam
*	Building	- Basement Wall or Slab, Column & Beam
*	Sewage Tank	- Slab & Wall
*	Oxidation Pond	- Slab & Wall
*	Chemical Tank	- Slab & Wall

Existing Surface Preparation

Precise and efficient surface preparation is essential to achieve the high adhesive qualities of **Cem MicroFume.** All concrete and mortar substrates must be sound, clean and free from oils, grease and surface contaminants. All loose materials and surface laitance must be removed. For large areas, grit or grit-water blasting or scabbling is recommended. For small areas and for

"spot" repairs, needle gunning or brush-hammering is effective. The concrete or mortar substrate must have a minimum compressive strength of 20MPa. If in doubt test with a "Schmidt Hammer".

The prepared substrate should be thoroughly soaked with clean water until uniformly saturated but with no surface water. This condition is referred to as saturated surface dry and care should be taken to remove any cement slurry or dust produced during surface preparation. The use of a "fan" shaped water jet is ideal. Steel reinforcements should have all traces of rust removed and be primed.

The **Cem MicroFume** and surrounding areas can be further treated with Gem Seal (**Acrylic Base Protection Paint or Waterproofing**) to provide a water and carbonation resistant finish

Without Formwork Preparation

The without formwork should be constructed to be leak proof, as **Cem MocroFume** is a free flowing material. However, it should include outlet to drain out water used for presoaking the substrate. Adequate air release outlets shall be installed. If repair is carried out at the soffit, provision for air venting through the substrate should be provided for.

Water Mixing Ratio

Flowable	3.30-3.75 Liters water
Pumping	3.75-4.55 Liters water

Mixing

Cem MicroFume should be mechanically mixed in a clean special mixer equipment or drum using a drill and paddle. A normal concrete mixer if NOT suitable. slowly while mixing. A minimum mixing time of 5 minutes is recommended to thoroughly blend the components with a maximum speed of 500 rpm to minimize air entrainment.

Priming: *Concrete*

Prior to application of **Cem MicroFume**, should be applied as a bonding structures element. Always work "wet on wet" on priming coats "**Top Gard WR" or** "**Cem Strength Primer" or "Gem Primer"**.

Priming: *Reinforcement*

Two coats of **"Epo Cem Primer or Epo Bond Primer"** should be brush applied to the prepared steel.

Application Method

After mixing, stir lightly with a spatula for a few seconds to release any entrapped air. Pour the free flowing mortar immediately into the prepared formwork. To obtain maximum benefit of the expansion, place the mortar within 20 minutes after mixing. Pour or pump the mixed material through a flexible tube (minimum 35mm-50mm Ø) to the lowest point in the formwork. Care shall be taken not to entrap any air during the repair operation as this might affect the bond properties of the repair.

When placing **Cem MicroFume** over a large area, it is important to maintain continuous flow throughout. Work sequence must be properly organized to ensure uninterrupted flow. In such large areas, **Cem MicroFume** may be pumped using a heavy-duty piston or screw feed pump.

Curing

To achieve the full potential of any cement based material, curing is essential. In warm or windy weather, the use of polythene sheets or damp Hessian is necessary to protect the repair work.

Exposed surfaces should be kept to a minimum and cured with appropriate curing method as soon as the mortar has hardened.

The formwork can be stripped after a minimum of 24 hours. However, for better results, it is recommended to keep the formwork on for at least 3 days.

Upon removal of the formwork, cure the repaired areas immediately with curing compound if no further treatment is required curing compound if a protective coating is to be applied (Consult our Technical Service)- Refer to the respective data sheet for application rate and method.

Test Properties of		**Cem MicroFume 110**	**Cem MicroFume STD**
Compressive Strength	N/mm2	80	65
Flexural Strength	N/mm2	9.20	8.80
Workability Slump	mm	40 (slump) & 340 (Flow)	40 (slump) & 340 (Flow)
Bleeding	%	0.001	0.001
Modulus of Elasticity	X10³ N/mm2	36.80	36.80
Shrinkages	%	0.025 (±0.010)	0.030 (±0.010)
Sulfate Expansion	%	0.003 (±0.001)	0.003 (±0.001)
Appearance		Grey	Grey
Density	kg/m³	2390 (±10)	2350 (±10)
Water absorption	(%)	<1.50	<1.50
Chloride Permeability (cores)	$x10^{-9}$ cm^2/s	0.03(no corrosion)	0.03(no corrosion)
Water Vapor Transmission	(%)	>69	>69
Electrical Resistivity (9 month)	k.o.c	109.2 (±15)	109.2 (±15)

Silica Fume Pure Powder Form Types

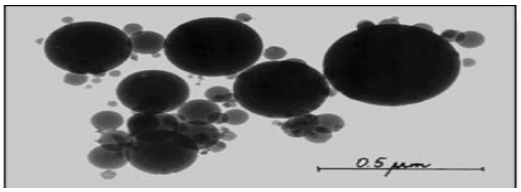
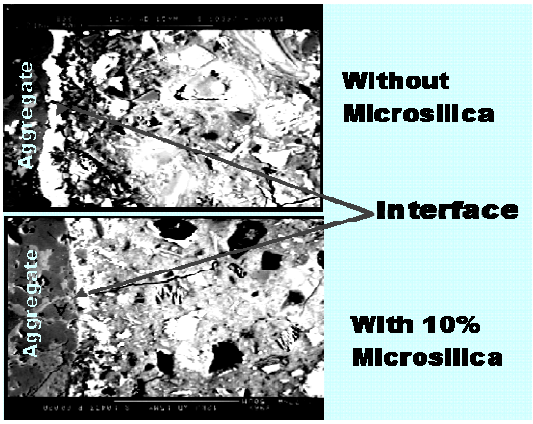


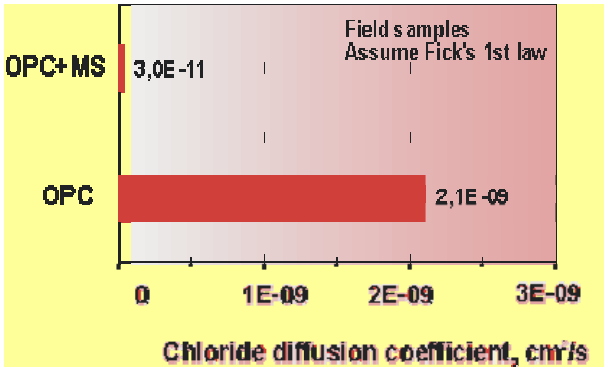
Image of Micro Silica Particles
Performance of Triple Blend Microsilica Concrete

Approval by: Global Certified
America: ASTM C1240-01
European: pr EN 13263-1
Japan: JIS A 6207-2000

Chemical Resistance to Acids

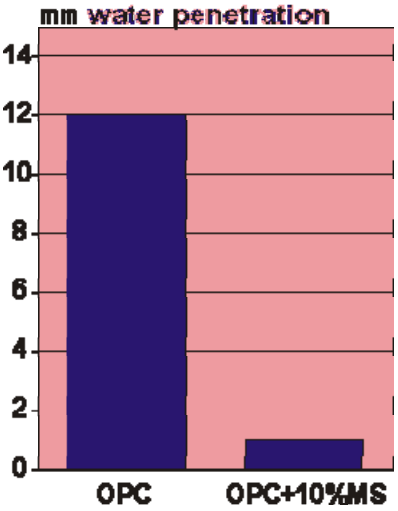


Chemical Resistance to Acids



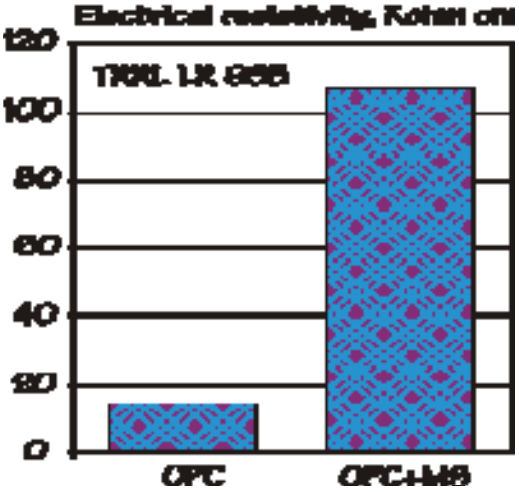
Chloride Diffusion Coefficient

Cem MicroFume : 0.003 [x10^{-9} cm^2/s]
OPC : 25.40 [x10^{-9} cm^2/s]



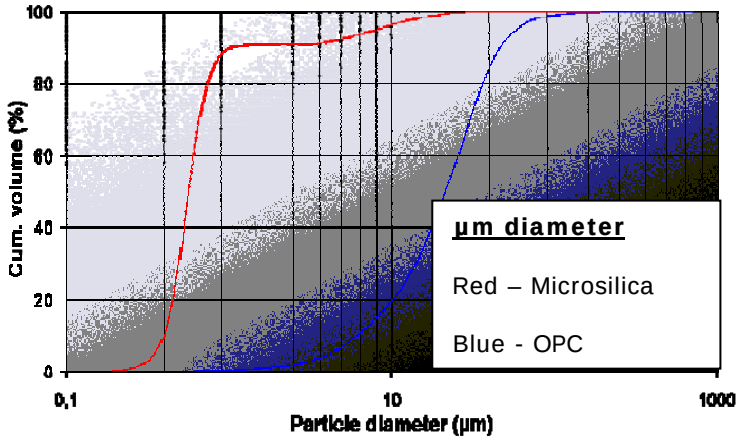
Water Permeability

OPC : 12.00%
Cem MicroFume : 0.80%



Electrical Resistivity Comparison

OPC : 17 [koc]
Cem MicroFume : 108 [koc]



Compressive Strength 110 N/mm2
186 m, BfG Bank, Frankfurt, Germany

Compression Strength >80 N/mm2
293 m, South Wacker Drive, Chicago, USA

Tsing Ma Bridge, Hong Kong

Spruce Tree Car Packing Building, Minnesota, USA

Norway

Wear Resistance for Pavement
Vestfold, Norway

Sub Sea Railway Tunnel, Storebelt, Denmark

Great Belt Brigde, Storebelt, Denmark

Mayer Parry Scrapyard, London, UK

The Giant Gullfaks C, North Sea

Packaging	**Cem MicroFume 110**	25 kg bag
	Cem MicroFume STD	25 kg bag

Safety Information

Detailed safety information is contained in each material safety data safety sheet, which can be obtained from our sales offices

Storage

Cem MicroFume has a shelf life of at least 6 months when stored between 0 ºC and 30 ºC in the lightly closed original container. The containers must be protected against direct sunlight. The "Best use before end" date of each batch appears on the product label.

Storage beyond the date specified on the label does not necessarily mean that the product is no longer usable. In this case however, the properties required for the intended use must be checked for quality assurance reasons.

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