

# Pozzolan Micronized Silica PMS 800

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## DESCRIPTION

PMS 800 is a highly reactive pozzolan. Like silica fume it is a very fine amorphous silica and falls into the microsilica family of products. When added with Portland cement PMS 800 facilitates high performance concrete by achieving:

- Increased compressive strength.
- Very low chloride ion diffusion.
- Improved sulphate resistance.
- Reduced water permeability.
- Improved abrasion resistance.
- Improved resistance to chemical attack.
- Reduction in efflorescence.
- Improved stability in geothermal environments.

In applications requiring long serviceability in harsh environments or where structural performance beyond current limitations are pre-requisites, PMS 800 should be used to economically satisfy the performance requirements.

## STANDARDS

PMS 800 meets with the Canadian Standard :

Can/CSA-A23.5-98 for type U Silica Fume.

ASTM C1240-01

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### **CHEMICAL & PHYSICAL PROPERTIES**

The selective quarrying operation and blending process ensures that the variation in chemical composition of the finished product is minimal.

The fineness of the product is achieved through a controlled process. Continuous monitoring of the process produces a product that has a particle size distribution which consistently lies within a pre-determined envelope.

SiO <sub>2</sub>	92.90 min.
Fe <sub>2</sub> O <sub>3</sub>	0.03 max.
Al <sub>2</sub> O <sub>3</sub>	0.90 max.
TiO <sub>2</sub>	0.10 max.
Bulk Density	620 kg/m <sup>3</sup> (approx).
Oil Absorption	28 g/100g.
pH	Neutral.
Hardness	7 Moh's.
Appearance	Light grey.

### **Action of PMS 800 in Concrete**

The high performance of concrete produced using PMS 800 is achieved through three principal mechanisms :

- The fine particle size reduces concrete bleed and helps improve bond at the aggregate interface with the cement paste.
- The pozzolanic reaction occurring when the free calcium hydroxide liberated in the cement hydration process reacts with the PMS 800 to produce additional calcium silicates.
- The very fine particles of PMS 800 are able to fill the microscopic voids between the cement particles, creating a less permeable concrete microstructure. The manufacturing process ensures the optimization of particle size and distribution.

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## **PERFORMANCE**

### **Improved Efficiency**

The contribution of PMS 800 to concrete strength can be quantified in terms of efficiency or an efficiency factor.

The efficiency of PMS 800 is defined as the ratio of PMS 800 dosage to the quantity of cement that can be removed to maintain strength. The efficiency factor for PMS 800 lies in the range of 2.1 to 3.3.

### **Agglomeration**

Recognizing the possibility of under performance and the potential for Alkali Aggregate Reactivity (AAR) within agglomerated silica particles, PMS 800 has been designed so that the particles do not agglomerate.

### **Water Demand**

Fine powders when introduced into concrete mixes, increase the water demand if workability is to be maintained.

This can be alleviated by the use of high range water reducers (superplasticizers). Required dosages will vary as to slump retention, cement type, raw materials and other concrete admixtures used. For PMS 800 the dosage of superplasticizer is less than for other highly reactive pozzolans.

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## **APPLICATION GUIDELINES**

The PMS 800 applications for specialist concretes and high performance concrete can be provided in more detail on each topic.

### **High Strength Concrete**

PMS 800 increases concrete strengths producing financial benefits to builders, developers and property owners. Columns and wall thickness are reduced providing cost saving and improved construction schedules. The internal cohesiveness of PMS 800 ensures a smooth formwork finish.

### **Commercial & Industrial Floors**

PMS 800 produces a tough durable concrete ideally suited to meet the high performance demands of today's industrial floors. PMS 800 will provide optimal concrete bleed for limiting plastic cracking, plastic settlement and delamination.

### **Waterproof Concrete**

The decrease in permeability is due to PMS 800's pozzolanic reactivity, refining the cement paste pore structure. The use of membranes in below ground structures is minimized.

### **Shotcrete**

The use of PMS 800 shotcrete eliminates expensive formwork and reduces construction time. PMS 800 reduces rebound and improves build.

### **Chemical Resistant Concrete**

PMS 800 concrete is resistant to many industrial chemicals. It has excellent sulphate resistance and negates the effects of alkali aggregate reactivity (AAR).

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### **Marine Concrete**

PMS 800 produces a marine concrete which has an extremely low chloride diffusion coefficient and high resistivity. It is a very effective concrete for marine environments.

### **CONCRETE MIXING**

PMS 800 particles normally do not agglomerate. Therefore, there is no need for extended mixing times to break up the agglomerates as is necessary with silica fume powders. Standard mixing procedures, if followed correctly, should ensure that adequate dispersion and wetting of microsilica particles is achieved.

A moderate increase in overall mixing time is necessary if PMS 800 “concrete ready” degradable paper bags are used.

**Do not add PMS 800 after the cement and water has been placed in the mixer.**

### **Recommended Mixing Procedure**

1. Add approximately 75% of the mixing water, PMS 800, aggregates and sands.
2. Add admixtures.
3. Allow to mix for at least 1 minute.
4. Add cement, remaining water and required admixtures.
5. Continue mixing.

Sufficient water to be added at the mixer to produce a minimum slump of 40mm. Superplasticizer can then be added at the plant or on site.

### **Product Note**

The information contained in this brochure is offered in good faith and every effort has been made to ensure the accuracy. However, due to difference in conditions, environments and materials, no liability is accepted by the Manufacturer or their agents for loss or damage, direct or otherwise, resulting from the application of the information contained herein. The manufacturer, reserves the right to change product specification without prior notice.

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