

A DETAILED STUDY ON ALCCOFINE 1203 WITH ITS BENEFITS, ADVANTAGE, PHYSICAL AND CHEMICAL PROPERTIES

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Abstract- The motive of the current study is to understand the effects of the addition of cementitious materials like Alccofine-1203. In this paper gives detailed overview about the Alccofine-1203 with its benefits, advantage and applications. Also discussed the physical and chemical properties of the Alccofine-1203.

Keywords- Alccofine-1203, Advantage, Cement, Concrete, Physical properties, Chemical Properties.

I. INTRODUCTION

Concrete is one of the most widely used building materials in the world. Concrete consists of three main components: water, aggregates (rocks, sand or gravel) and Portland cement. Cement, usually in the form of powder, acts as a binding material when mixed with water and aggregates. The mixture of cement, sand and aggregate with water results in solid block after getting set together. Concrete is very strong in resisting the compression while weak in tension. For the purpose of enhancing the tensile properties, the steel bars are incorporated as reinforcing agent in the concrete structures. Alccofine-1203 is a supplementary cementitious material suitably replaces Silica fume used in high performance concrete.

Foundry sand is clean, uniformly sized, high quality silica sand, used in foundry casting processes. The sand is bonded to form molds or patterns used for ferrous (iron and steel) and non-ferrous (copper, aluminum, brass) metal castings. Shake-out sand from

completed metal casting is often reclaimed back into the foundry sand process.

II. ALCCOFFINE-1203

- Alccofine-1203 (AF) is a product of Ambuja Cement Ltd, an extra high-purity, high-grade, highly slag cement material.
- Alccofine-1203 is an additive to concrete and mortars. The density ranges from 600 to 700 kg / m³.
- The Alccofine-1203 metal blend can be used to increase strength and economic design.
- Alccofine 1203 is a revolutionary new material, used as a substitute to Micro Silica / Silica Fumes.
- Alccofine-1203 provides innovative solutions to improve the performance of Concrete many folds without increasing the cost.

III. BENEFITS OF ALCCOFINE-1203

Benefits in Fresh State

- The workability of the mix retention gets improved.
- Increase in flow ability of the mix
- Reduction in the segregation in the mix
- The heat of hydration is also reduced

Benefits in Hardened state

- Improves the durability of the mix
- Increases strength at all ages

- Resist the attack of chemicals / corrosion
- Reduces permeability of the mix.

IV. APPLICATION OF ALCCOFINE-1203

- Bridges
- Airports and roads
- High rise structure

Recent application of Alccofine-1203 in India

Project First Cable Stayed Bridge at Nagpur

- Better rheological properties were achieved with the help of Alccofine-1203.
- Fast strength gain (50 MPa at 7 days).
- Modulus of elasticity 43 GPa achieved pumping and placing of concrete was much easier with Alccofine-1203 compared to other micro-fine additive.

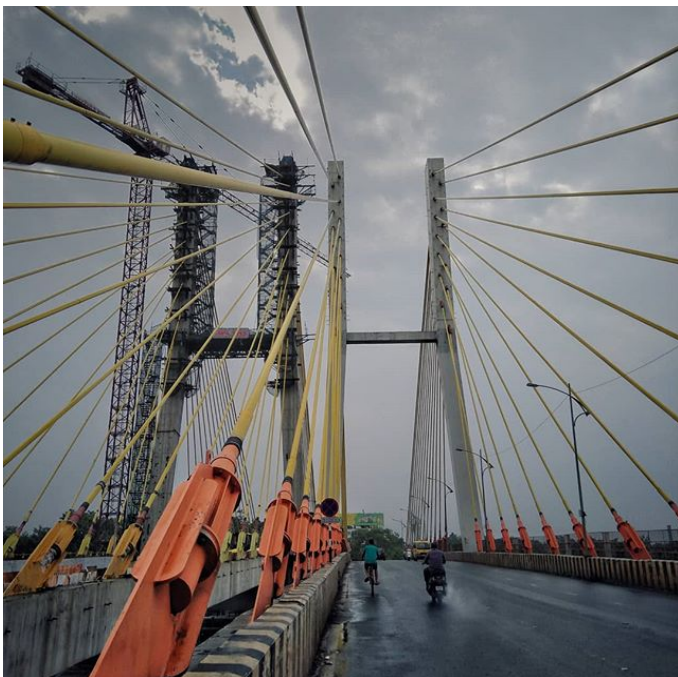


Fig 1. Cable Stayed Bridge at Nagpur

Kochi Metro in Kerala Alccofine-1203 is Being Used

Precast elements of 13.4 km long elevated stretch of Kochi Metro were successfully casted by using more than 1000 MT of Alccofine 1203. Stringent criterias of high early strength and consistency were

successfully met with Alccofine 1203. Concrete elements with Alccofine will surely stand the test of time.



Fig 2. Kochi Metro in Kerala

V. CHEMICAL AND PHYSICAL PROPERTIES OF ALCCOFINE-1203

A. *Chemical Composition of Alccofine-1203*

(As per specifications supplied by manufacture “Ambuja Cement Ltd”)

Table 1. Chemical Composition of Alccofine-1203

Chemical Composition	
Constituents	Composition (%)
SiO ₂	35.30
CaO	32.20
Al ₂ O ₃	21.40
MgO	6.20
Fe ₂ O ₃	1.20
SO ₃	0.13

B. Physical Properties of Alccofine-1203

(As per specifications supplied by manufacture
“Ambuja Cement Ltd”)

Table 2. Physical Properties of Alccofine-1203

Physical Properties	
Physical Property	Results
Particle size distribution(micro meter)	150-600
D ₁₀	1.8
D ₅₀	4.4
D ₉₀	8.9
Specific surface area	1200
Specific Gravity	2.70
Average particle size(microns)	4-6
Fineness(cm ² /gm)	12000
Bulk density(kg/m ³)	680(600 to 700)

VI. CONCLUSION

In this paper gives detailed overview about the Alccofine-1203 with its benefits, advantage, applications and also discussed the physical and chemical properties of the Alccofine-1203. The aim of study is to increase the compressive strength, split tensile strength, and flexural strength of concrete mix and reducing the environmental pollution by using waste foundry sand and conserving natural resources.

VII. REFERENCES

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