Technical Data Sheet

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Carbofen® 6060

Plasticiser and Air Entraining Agent

PRODUCT DESCRIPTION

Carbofen 6060 is a natural resin especially modified providing a product with specific properties for air entrainment. Derived from a renewable natural source: a special resinous part of Araucaria angustifolia, Carbofen 6060 has a complex chemical composition similar to the oxidised colophony.
After the neutralization process it acquires excellent properties as an air-entraining agent for microcellular concrete. We present the following advantages of the use of Carbofen 6060 regarding concrete:

- Better plasticity/elasticity avoiding shrinkage cracking
- Better workability and use of less mixing water
- Higher resistance to cracks caused by freeze-thaw cycles;
- Better resistance to the sulfate;
- It does not provoke volume changes in concrete;
- Good stability of the viscosity;
- Easy preparation of the admixture.

SPECIFICATIONS

Acid Number, ASTM D-465 (mg KOH/g)	80 - 100
Softening point, ASTM E-28 (B&R ºC)	100 - 120

APPLICATIONS

The air entraining agents have broad use in foundations of the concrete, slabs, dikes, tunnels, canals, bridges, concrete highways projects, and others. It produces a content of air in the order of 3% and 6% in the concrete with dosages of 0.02% to 0.06% of Carbofen 6060. To increase the properties one can increase these quantities once experimental tests take place.

ACTION OF AIR ENTRAINING AGENT

Retention of air in the concrete consists in the mechanic entraining of a large and well distributed number of minuscule air bubbles during the mixing of the concrete obtained by the addition of the appropriate air entraining agent.
The entrainment of air in the concrete is very important, since due to the float of the minuscule bubbles of air that are distributed in the mixture the sedimentation of the solid particles is delayed.
The "bleeding" is reduced providing an overall better quality of the concrete, better resistance to freezing and thawing cycles as well as better plasticity, uniformity, and cohesion characteristics. The honeycomb-like areas (areas of great space), which are caused by bad consolidation after the placement of concrete, are reduced and sometimes eliminated with the entraining of the air and therefore improving the overall quality of the structure.

There are several items that have influence on the quality of the entrained air, such as: composition of the mixture, consistency of the concrete, temperature, vibration, classification of the type and size of the aglomerate, among others. Therefore, one must look for the best conditions.

USING INSTRUCTIONS

Follow the table to get a neutralized solution:

Product	Weight %
Carbofen 6060	8.33%
Water	88.34%
NaOH 50% aq.	3.33%

The neutralization process is as follows: add the water into a batch reactor, heat it up to 80 ºC (176ºF), then slowly add the soda solution. Afterwards, pour Carbofen 6060 while constantly stirring. After dissolution stir the solution for 30 minutes and let it cool.
It may be stored at 2º C (35ºF) or higher. If it freezes thaw and reconstitute by mild mechanical agitation. Dispersion by aeration should be avoided to prevent foaming.

A dosage of 30-50 ml per 50 kg (110lb) of cement is enough to incorporate 3-6 % of air in the concrete admixture. The above mentioned range of air incorporation can vary a little depending on the raw materials used in the admixture. Only by performing tests with the specific admixture the exact dosage can be determined.

IMPORTANT

The quantity of neutralized solution varies according to the proprieties of the concrete being used. Experimental tests must be performed to find the exact amount of the air entraining agent used.

PROPERTIES OF PRODUCT

See tables on the next page.

PACKAGING

Powder product in paper bags of 25 kg – 55 lb
Big Bags of 840 kg – 1900 lb

PRODUCT INFORMATION AND SAFETY

Read our Material Safety Data Sheet (MSDS).

Technical Data Sheet

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Version 1

Carbofen® 6060

Air Entraining Agent

CONCRETE USE

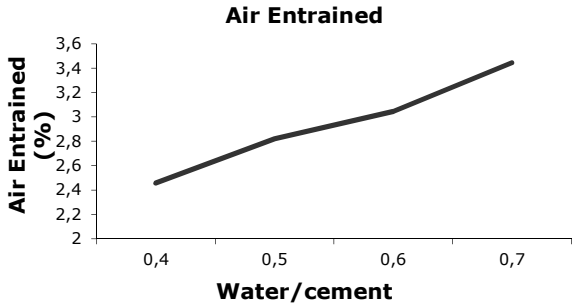
Test performed at "Laboratório de Materiais de Construção do CEFET-Pr", Brazil.
Raw Materials:

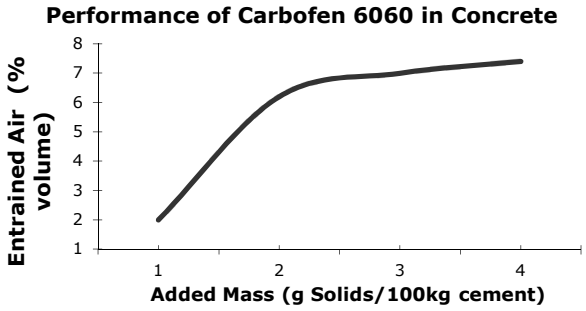
- Portland Cement – CP V – ARI –RS
- quartz sand - 9 mm máx
- solution Carbofen 6060
- aggregate 2 –19 mm máx
- mixture 1: 2.62 : 2.98

Table of efficiency and resistance of product.

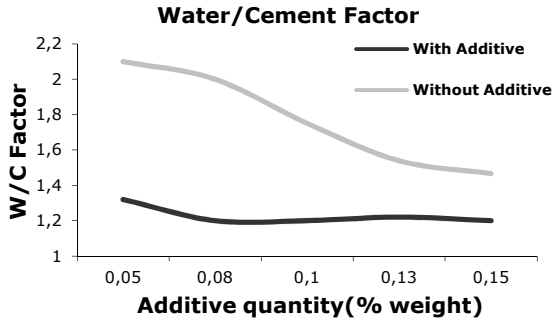
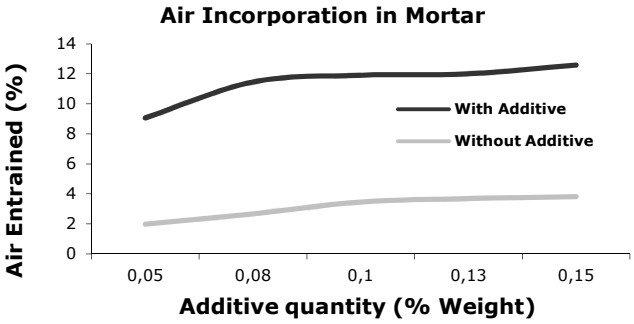
Factor W/C (Water/Cement)	Air Incorporated (%)	Specific Weight (g/cm³)	Resistency 7 days (MPA)	Resistency 28 days (MPA)
0.4	2.456	2.427	30.00	36.82
0.5	2.819	2.344	18.63	24.23
0.6	3.044	2.293	12.00	16.60
0.7	3.445	2.242	9.00	12.22

The test was performed using a compressive machine EMIC with capacity of 200 Tf, and registered the necessary force to reach the fracture at all four corps tested : two at the 7th day and the other two at the 28th day after preparation of the concrete following the NBR-5739 rule.
The air incorporation test was performed following the NBR-13278/1995 rule.





MORTAR USE

Test performed at "Laboratório de Materiais de Construção do CEFET-Pr", Brazil.
Raw Materials:

- Portland cement – CP II – F32
- Hydrated Cal CH III type
- Quartz sand – "2 zone" classified following NBR-7211 rule.
  Maxim characteristic dimension: 2.4 mm.
  Specific mass: 2.66 g/cm^3
  Absorption: 0.88 %