High-efficiency CSA Expansive Agent

General description

High-efficiency CSA Expansive Agent is obtained by blending suitable natural anhydrite with a specially manufactured clinker which consists essentially of calcium sulphoaluminate and CaO. High-efficiency CSA expansive agent is always mixed with ordinary cement. When mixed in the proper proportions with ordinary cement and hydrated, cement mortar or concrete expands during the early stages of hydration. This expansion, when restrained, makes it possible to minimize drying shrinkage. Moreover, when the ratio of High-efficiency CSA Expansive Agent to ordinary cement is increased its high expansion qualities make it ideal for use in prestressed concrete.

High-efficiency CSA Expansive Agent is being used in all sections of the construction fields and by a wide variety of concrete products manufacturers.

High-efficiency CSA Expansive Agent is manufactured under a strict quality assurance systems GB/T 19001-2000 (i.e. ISO9001:2000) and GB/T 24001-1996 (i.e. ISO 14001:1996)) which accommodates the technical requirements of building chemistry formulators.

The properties of High-efficiency CSA Expansive Agent conform to the standards of the manufacturer and to the Chinese relevant standards.

Characteristics of High-efficiency CSA Expansive Agent

- ◇ Low alkalinity. High-efficiency CSA Expansive Agent has a very low alkali content (R_2O<0.3%) which is beneficial to avoid AAR in concrete.
- ◇ Short stable stage of expansion. The stable stage of expansion is not more than 14 days, thus the ultimate strength of concrete is not affected.
- ◇ Low dosage and high expansion capacity. The normal dosage of High-efficiency CSA Expansive Agent is 6~8% by the weight of ordinary cement, which is lower compared with other expansive additives such as UEA and CEA (their dosages are about 10~12% by the weight of cement) in the market.

Features by using High-efficiency CSA Expansive Agent

- ◇ Prevents cracking due to drying shrinkage and hydration heats;
- ◇ Increases the water tightness of concrete and thus is useful for waterproofing buildings;
- ◇ Enables the manufacture of high strength concrete products through chemical

prestressing.

Chemical Analysis

Main constituents (%) Based on Percent of Weight

CSA- Ⅰ

	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3	TiO_2	Cl-	Igloss
Usual range	5.5~7	5~7	1~2	50~52	2~4	24~27	<1	<0.05	6~8

CSA- Ⅱ

	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3	TiO_2	Cl-	Igloss
Usual range	3~5	8~10	0.5~1.5	51~53	2~4	25~28	<1	<0.05	6~8

Mineral Composition: CaO, CaSO4, 3CaO 3Al2O3 CaSO4

Specific Surface Area: 200~400 m2/kg Specific Gravity: 2.8~3.0

Physical Properties

The restrained expansion rate tested under standard condition:

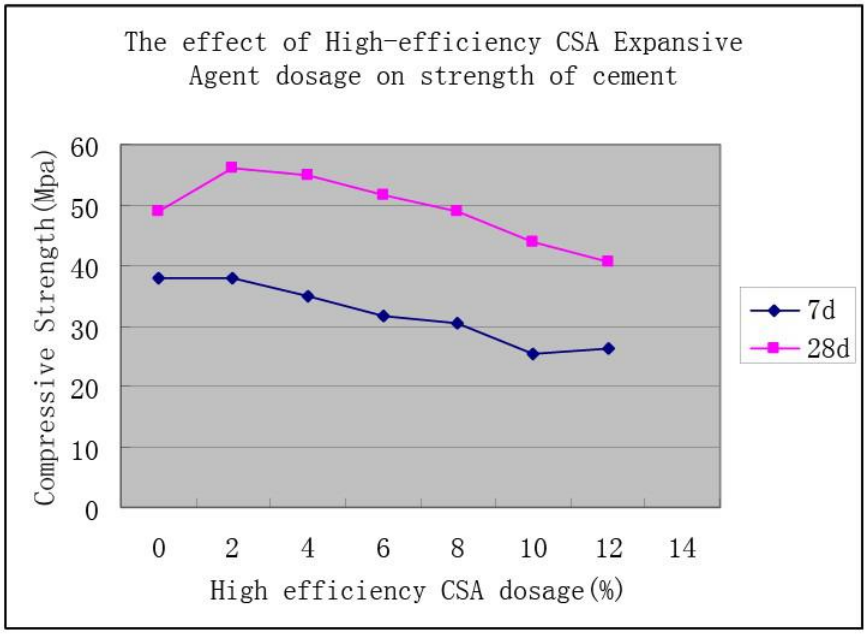
CSA- Ⅰ

Dosage of High-efficiency CSA Expansive Agent to Ordinary Portland Cement (%)	Restrained-expansion rate (%)				
7	Curing in water for 1 day	Curing in water for 3 days	Curing in water for 7 days	Curing in water for 28 days	Curing in air, constant humidity for 21 days
	0.01~0.015	0.02	0.03		>-0.02

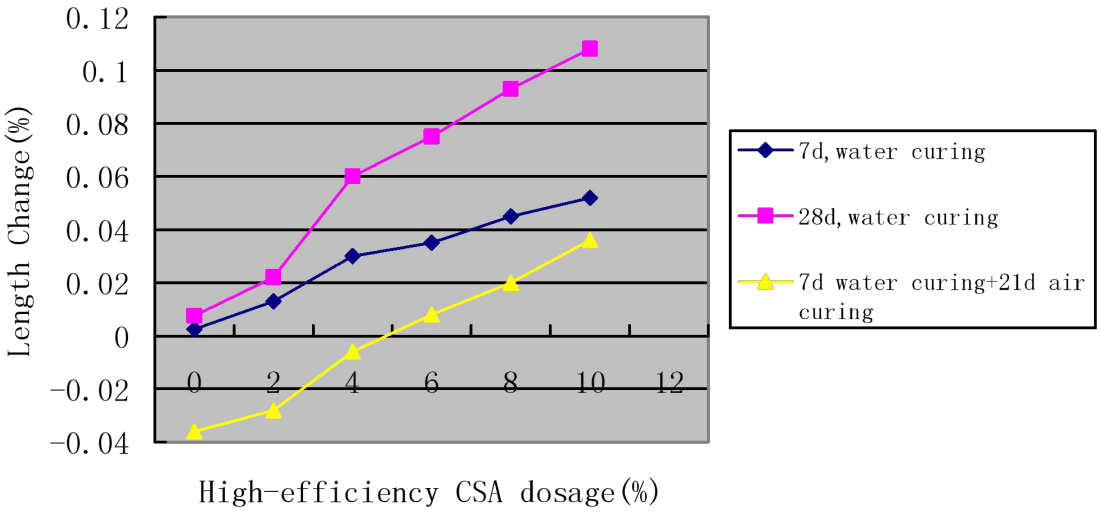
CSA- Ⅱ

Dosage of High-efficiency CSA Expansive Agent to Ordinary Portland Cement (%)	Restrained-expansion rate (%)				
7	Curing in water for 1 day	Curing in water for 3 days	Curing in water for 7 days	Curing in water for 28 days	Curing in air, constant humidity for 21 days
	0.015	0.025	0.04	0.07	0

The effect of High-efficiency CSA Expansive Agent dosage on strength of cement mortar:



Longitudinal change of mortar:



Directions for Use

1 Dosage High-efficiency CSA Expansive Agent is used as a part of cement, its proportion to ordinary Portland cement depends upon the intended use and the degree of restraint. The proportion of High-efficiency CSA Expansive Agent to ordinary cement generally used in China is about 6~8%

2 Mixing

High-efficiency CSA Expansive Agent and ordinary cement must be thoroughly and uniformly mixed in a mechanical mixer with aggregate and water for a slightly longer time than normal concrete.

3 Curing

To ensure the proper development of the ettringite needle crystals which are important in preventing shrinkage cracks which occur during drying period, it is recommended that water be sprayed or membrane curing onto the concrete surface for curing at least 14 days after the concrete is cast.

4 Storage

High-efficiency CSA Expansive Agent is more sensitive to water and moisture than other cementitious material and is therefore packed in completely waterproof bags and should always be kept and stored in a dry place.