

Dynamon SP3

Superplasticizer based on modified acrylic polymer for precast concrete with low water/cement ratio and very high mechanical strengths at early age in winter time, without steam curing

DESCRIPTION

Dynamon SP3 is an admixture based on modified acrylic polymer specially designed for the precast concrete industry, belonging to the new revolutionary MAPEI **Dynamon SP** system.

The **Dynamon SP** system is based on DPP (Designed Performance Polymer) technology; a new chemical process that can model the admixture's properties in relation to the specific performances required for concrete. This process is developed by means of a complete design and production of monomers (an exclusive MAPEI know-how).

WHERE TO USE

The concrete with **Dynamon SP3** has a high level of workability (consistency class S4 or S5, according to EN 206-1), and is consequently easy to apply when fresh. At the same time it offers excellent mechanical performances when hardened.

Dynamon SP3 is clearly an admixture with superior performances in comparison with traditional naphthalene-sulphonate or melamine-sulphonate based superplasticizers and first generation acrylic admixtures in terms of water reduction and increase of strength at early age. **Dynamon SP3** is especially suitable for precast concrete and wherever there is the need for a

strong water reduction, along with relatively high mechanical strengths at early age in different consistency classes.

The real news is that by using **Dynamon SP3** it is possible to completely eliminate the accelerated steam curing treatment, even at very low external temperatures.

As a matter of fact it is at the lowest temperatures (< 10°C) that **Dynamon SP3** promotes the mechanical strengths increase. It is thus possible to maintain a natural curing, also during winter and in any place. The advantages of this news consists in the reduction of the steam costs and in an improved use of the concrete caused by the elimination of the thermal treatment. This, as it is commonly known, could damage the internal micro structure of the concrete and reduce both the long term mechanical properties and the durability.

Its performances make it particularly suitable for manufacturing self-compacting concrete since **Dynamon SP3** can ensure high workability and at the same time does not significantly slow down the development of mechanical strengths at early age.

For self-compacting concrete it is necessary to use **Viscofluid SCC** or **Viscofluid SCC/10**, viscosity modifying admixtures with **Dynamon SP3** in order to avoid the risk of

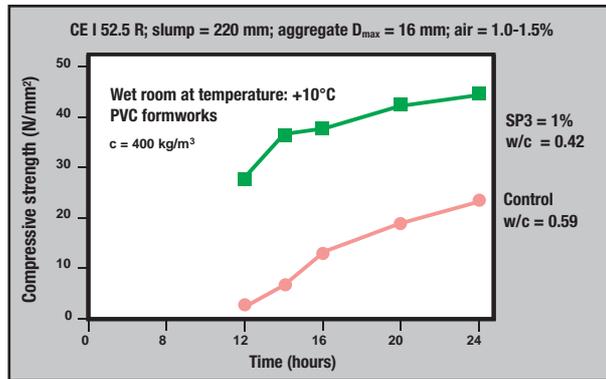


Figure 1 - Compressive strengths for concretes prepared with Dynamon SP3 and for reference concrete cured at a temperature of +10°C

segregation and ensure the mixture's homogeneity even with a very high slump-flow.

The main applications of **Dynamon SP3** for concrete are as follows:

- concrete for manufacturing precast reinforced beams with a high level of workability and a minimum compressive strength, R_{ckj} , to cut the prestressed tendons, equal to 35 N/mm²;
- for manufacturing prestressed reinforced concrete roofing slabs, with a high level of workability, and a minimum compressive strength, R_{ckj} , to cut the prestressed tendons, equal to 35 N/mm² and with an excellent appearance;
- for manufacturing cladding panels with a high level of workability, a very refined surface and an excellent appearance;
- self-compacting concrete for precasting. Together with the **Viscofluid SCC** or **Viscofluid SCC/10** viscosity modifying admixtures, **Dynamon SP3** is suitable for manufacturing self-compacting concrete which can be poured without vibration. Its characteristics of fluidity and resistance to segregation are also suitable for a fast casting procedure.

TECHNICAL CHARACTERISTICS

Dynamon SP3 consists of a water solution containing 22% of new generation acrylic polymers, with no formaldehyde. The polymers can efficiently disperse the cement grains and they can facilitate a fast temperature increase within the concrete (see technical data table).

It is possible to use the dispersing action of **Dynamon SP3** in the following three advantageous ways:

- a) to reduce the amount of water at the same workability;
- b) to increase workability at the same water-cement ratio;
- c) to reduce both water and cement at the same water-cement ratio and the same workability.

Figure 1 - Shows the development of compressive strength at a temperature of +10°C from 12 hours to 1 day, for a reference concrete and for a concrete prepared with **Dynamon SP3** at 1% of volume by weight of cement.

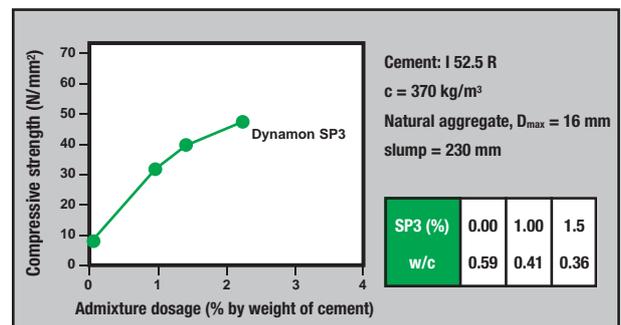


Figure 2 - Influence of Dynamon SP3 on the compressive strength after 16 hours for concretes cured at a temperature of +10°C

Figure 2 shows the influence of **Dynamon SP3** dosage on the compressive strengths at very early age for concretes cured at a temperature of +10°C.

APPLICATION PROCEDURE

Dynamon SP3 develops maximum dispersing action when added after the other mixture ingredients (cement, aggregates, mineral addition or filler and at least 80% of the mixing water) and before **Viscofluid SCC** or **Viscofluid SCC/10**.

COMPATIBILITY WITH OTHER PRODUCTS

Dynamon SP3 admixture is compatible with other products for preparing special concretes, especially with:

- **Dynamon HAA**, hardening accelerating admixture free of chlorides for reaching very high mechanical strengths at early age;
- **Viscofluid SCC** or **Viscofluid SCC/10**, viscosity modifying admixtures for manufacturing self-compacting concretes;
- **Mapeplast SF**, silica fume based powder admixture for manufacturing "top-quality" concrete (strength, impermeability, durability);

TECHNICAL DATA (typical values)			
PRODUCT IDENTITY			
Consistency:	liquid		
Colour:	amber		
Density according to ISO 758 (g/cm³):	1.06 ± 0.02 at +20°C		
Dry content according to EN 480-8 (%):	22 ± 1.1		
Specific action:	increase workability and/or reduction of mixing water and very strong acceleration of mechanical strengths at early age and at temperatures < 10°C		
Classification according to EN 934-2:	high range water reducing, hardening accelerating, superplasticizer, tables 3.1, 3.2 and 7		
Chlorides soluble in water according to EN 480-10 (%):	< 0.1 (absente according to EN 934-2)		
Alkali content (Na₂O equivalent) according to EN 480-12 (%):	< 2.0		
Storage:	12 months, protect from frost		
Hazard classification according to 99/45/EC:	none. Before using refer to the "Safety instructions for the preparation and application" paragraph and the information on the packing and Safety Data Sheet		
Customs class:	3824 40 00		
PERFORMANCE DATA OF DYNAMON SP3 WITH CONCRETE*			
Admixture dosage (% of volume by weight of cement):	0	1	1.5
w/c:	0.59	0.41	0.36
Water reduction (%):	–	30	37
Initial slump (mm):	220	230	230
Slump after 30 minutes (mm):	200	200	200
14 hour Rcm (N/mm²) • 10°C:	8	35	39
1-day Rcm (N/mm²) • 10°C:	20	48	52
7-day Rcm (N/mm²) • 10°C:	35	65	68
28-day Rcm (N/mm²) • 10°C:	45	76	79
Water penetration under pressure according to EN 12390/8 (mm):	25	0	0
Durability (resistance to the environmental exposure classes according to EN 206-1):	X0, XC1 XC2	X0, XC1 XC2, XC3, XC4 XD1, XD2, XD3 XS1, XS2, XS3 XA1, XA2, XA3 XF1	X0, XC1 XC2, XC3, XC4 XD1, XD2, XD3 XS1 XS2, XS3 XA1, XA2, XA3 XF1

* The above mentioned data refers to average values obtained in concretes prepared with type I 52.5 R cement (370 kg/m³) and natural aggregate with D_{max} 16 mm and cured in a climatic room at $T = 10^{\circ}\text{C}$.

