

# FLOWCABLE

A chloride free, powder form admixture for use in the production of grouts to protect post-tensioned cables in prestressed concrete

## DESCRIPTION

**Flowcable** is a product in powder form. It is added at the rate of about 6% by weight of cement to produce a flowable, pumpable, non-shrink, non-segregating, impermeable grout providing high strength and high bond to steel. The most important property **Flowcable** imparts to filling grout is the protection of cables against corrosion from aggressive agents and against stress corrosion.

The inadequate protection against corrosion offered by normal grouts is due to:

- High capillary microporosity due to high water/cement ratio. Using **Flowcable** the water/cement ratio is about 0.3;
- High macroporosity caused by bleed water collecting under strands and in the upper part of the sheath. When bleed water evaporates or is reabsorbed by the cement paste, big cavities form thus providing easy access for corroding substances. With **Flowcable** the volume of bleed water is considerably lower: it ranges from 0 to a maximum of 0.2% depending upon the type of cement used;
- Shrinkage of cement paste and consequent cracking. With normal cement grouts final shrinkage varies from 2000 to 3000 microstrain. **Flowcable** allows not only shrinkage to be eliminated completely, but also slight expansion to occur during setting and hardening.

## FEATURES AND BENEFITS

- *Very high flowability (as measured by the Flow Cone Test) without bleed water or with a very low amount*
- *High mix water retention*
- *Shrinkage compensated*
- *Initial setting time of more than 3 hours at 30°C*
- *High early and ultimate strengths*
- *High bond to steel*

## PERFORMANCE DATA

Owing to its high flowability, a grout made with cement and **Flowcable** assures the complete filling of sheaths, especially among the strands of cables. This ensures maximum protection of steel against corrosion caused by aggressive agents. As this high flowability is obtained with low water/cement ratio, the hardened cement paste is dense, compact, impermeable and, therefore, highly durable. On the other hand, the high cohesion of the fresh mix, together with the freedom from shrinkage, prevents the formation of large cavities, which are often responsible for the penetration of aggressive agents.

## ESTIMATING DATA

Approximately 68 litres of highly flowable grout are obtained by mixing 100kg of cement, 6kg of **Flowcable** and 34 litres of water.

## MIXING

Introduce approx. 25 litres of water per 100kg of cement into the mixer.

**Start the mixer and first add FLOWCABLE (6% by the weight of cement) and then cement.**

Mix for 3 minutes until a plastic and homogeneous mixture is obtained. Add approx. 7 litres of water and mix further for 2 minutes until the grout is flowable, without lumps and the flow cone empties in approx. 20 seconds. If a high speed mixer is used (about 1500 rpm) the total mixing time can be reduced from 5 to 3 minutes. The necessary mixing water by weight of cement and **Flowcable** is approx. 34% but can range from a minimum of 30% to a maximum of 38% depending upon the cement used: finely ground cement usually requires a higher amount of water. The grout thus obtained can generally be pumped for at least 2 hours, unless the cement used shows rapid or false set. Field testing is recommended with the appropriate cement type.

## PACKAGING

**Flowcable** is supplied in 15kg bags.

## SHELF LIFE

**Flowcable** can be stored in a sheltered and dry place for 12 months. Do not use product if bag is damaged or has been opened for more than 1 month.

## PRECAUTIONS

The temperature of walls and spaces where the grout is to be pumped should be between 5°C and 40°C for optimum results. If temperature is outside this range, consult your local BASF Construction Chemicals representative.

**Flowcable** is a chloride-free product, which is specially important in the case of cables. However, chlorides can be introduced into a mix if brackish water or special types of cement are used. Therefore the use of drinkable water (generally containing less than 40 mg/l of chloride) and chloride-free cements (C1 lower than 0.06% by weight of cement) is recommended.

Though all Portland, pozzolanic or slag cements may be employed, the use of G.P. Cement is recommended in cold weather



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Table 1 - Examples of properties of cement pastes containing 6% of Flowcable

Type of cement	Water	Flow-Cone Test (1)			Bleed water (2)	Water Retention (3)	Expansion at 2 days (4)	Setting times at 30°C		Specific Gravity
		(seconds)						(mm/μm)	(hrs:mins)	
	% by wgt of cement & Flowcable	0'	30'	1'	(% by volume)	(%)				(g/cm)
525PTL	34.4	23	33	38	0.13	95.6	450	4:15	4:45	2.030
425PTL(A)	33.6	23	25.5	34	0.03	97.2	700	4:35	5:05	2.020
425PTL(B)	29.6	25	27	38	0.00	95.4	500	3:25	3:45	2.045
425PTL(C)	30.4	25	31	34	0.10	96.0	500	4:15	4:55	2.050
325PTL(A)	28.8	22	23	30	0.10	97.4	750	4:00	4:33	2.080
325PTL(B)	29.6	23	25	33	0.12	94.0	600	3:47	4:15	2.075
325 Pozz.	32.4	24	25	24	0.15	93.7	600	5:00	5:40	2.010
325 Slag	32.0	22	27	28	0.15	92.0	500	5:05	5:55	2.070

(1) Flow-Cone Test (conforming to CRD-C-79) after varying times of continuous mixing

(2) Test conforming to ASTM C 232

(3) Test conforming to ASTM C91; the value was taken after 5 minutes

(4) Test conforming to ASTM C878. No length changes were observed at later times.

All BASF Construction Chemicals Australia & New Zealand data sheets are updated on a regular basis, it is the user's responsibility to obtain the most recent issue **AFC/5/0806**

## STATEMENT OF RESPONSIBILITY

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