

EXPERIMENTAL RHEOLOGICAL STUDY OF A SELF-COMPACTING CONCRETE REINFORCED WITH STEEL FIBERS.

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In this work, the conditions of self compactability of a self-compacting concrete reinforced with steel fibers have been experimentally evaluated.

The concrete has been manufactured by LAFARGEHOLCIM, for its elaboration it has been used CEM II/A-M (P-V) 42.5 R cement manufactured by Lafarge, with a content of 350 Kg/m³ and a water cement ratio of 0.56. Plasticizers (1.9) and super plasticizers (5.8) have been added as additives. As reinforcement, cold drawn steel fibers of 50 mm length and 0.62 mm diameter (slenderness 80.6) have been used, with a dosage of 10 kg/m³, supplied by the company Bekaert with the commercial name Dramix.

To guarantee that the studied concrete has the necessary characteristics to be able to catalogue it as self-compacting, we have carried out the tests of runoff, funnel in V, box in L and runoff with ring J according to the instruction EHE-08 [1]. Figure 1 shows the performance of the runoff test.



Figure 1. Performing the runoff test

Table 1 shows the results obtained and their comparison with the limits set by annex 17 of the instruction EHE-08 [1] where the conditions required to consider a concrete as self-compacting are indicated.

Table 1. Set of data obtained for checking the characteristics of self-compacting concrete

TEST	PARAMETER	VALUE	RANGE EHE
Runoff test (UNE 83361:2007)	d_f (mm)	700	550 – 850
	T_{50} (s)	6.37	$T_{50} \leq 8$ s
Runoff test with “anillo Japonés” (UNE 83362:2007)	d_{jf} (mm)	695	$\geq d_f - 50$ mm
	T_{j50} (s)	2,63	
	H_1 (cm)	6,5	
	H_2 (cm)	8,5	
	C_{bE}	131	
Method of L box (UNE 83363:2007)	T_{60} (s)	4,03	
	H_1 (cm)	12	
	H_2 (cm)	9,2	
	C_{bL}	0,77	0,75 - 1,00
V Funnel test (UNE 83364:2007)	T_v (s)	4,56	4 s – 20 s

It has also obtained the density in fresh state obtaining a value of 2,358 g/L and the percentage of air occluded that has been of 2.4%.

The data in table 1 make it possible to verify that, despite the fiber content of the concrete, which contributes to significantly diminish the characteristics of self-compaction, the concrete can be defined as self-compacting with the requirements of the Instruction EHE 08.

REFERENCES

[1] Ministerio de Fomento. Instrucción de Hormigón Estructural EHE 08, Madrid, 2008.