



**YILDIZ TECHNICAL UNIVERSITY
CIVIL ENGINEERING DEPARTMENT
CONSTRUCTION MATERIALS DIVISION**

CONSTRUCTION MATERIALS / LABORATORY REPORT 2: CEMENT

Name- Surname:

Student No.:

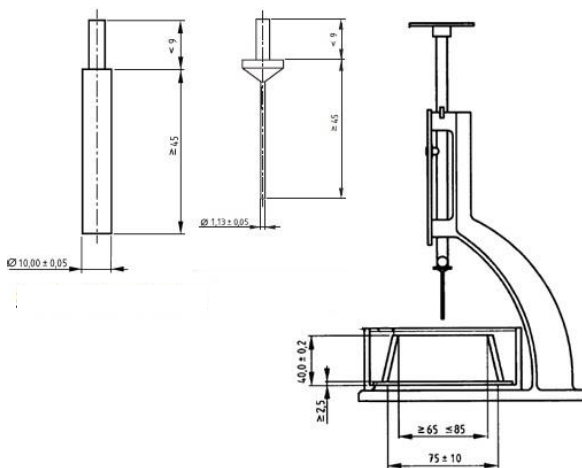
2.1. SPECIFIC GRAVITY (DENSITY) OF CEMENT

Calculations:

Table 2.1. Specific gravity of cement

Sample	W (g)	V ₁ (cm ³)	V ₂ (cm ³)	γ (g/cm ³)
CEM I 42,5 R				

2.2. STANDARD CONSISTENCE AND SETTING TIME TESTS (EN 196-3)



The water content of the paste expressed as a percentage by mass of the cement is% and the distance between the base plate and the bottom face of the plunger is mm.

According to test results:

☐ The water content of the mix design is sufficient to obtain standard consistency.

☐ We must repeat the test with **...an increase/ a decrease...** in the water content until one is found to produce a distance between plunger and base-plate of (6 ± 2) mm.

Figure 2.1. Side view of the Vicat apparatus.

Table 2.2. Test results for setting time

t (min.)	0	10	20	30	40	50	60	70	80	90	120	150	180	210	240	270	300
h* (mm)	40	40	40	40	38	36	34	33	32	28	25	20	12	6	2	0	0

h*: Penetration depth of Vicat needle

According to the test results given in Table 2.2:

- Initial setting time.....min. (for $h=6\pm 3$ mm)
- Final setting timemin. (for $h=0.5$ mm)

2.3. FLEXURAL AND COMPRESSIVE STRENGTH (TS EN 196-1)

Each batch for three test specimens consists of:

..... g cement

..... g CEN standard sand

..... g water

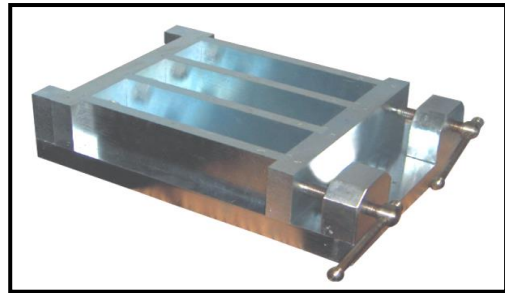


Figure 2.2. The prismatic mold with the dimensions of 40x40x160 mm³

Table 2.3. The compressive and flexural strength test results at 28 days.

Sample No.	Failure Load for Bending Test (kN)	Flexural Strength (MPa)	Failure Load for Compression Test (kN)	Compressive strength (MPa)	Average compressive strength (MPa)
1	5,7	...	72,9 / 71,1	...	...
2	4,2	...	63,6 / 64,1	...	
3	...	...	...	...	

Calculations:

Table 2.4. Mechanical and physical requirements given as characteristic values (EN 197-1).

Strength class	Compressive strength MPa				Initial setting time
	Early strength		Standard strength		
	2 days	7 days	28 days		min
32,5 N	-	≥ 16,0	≥ 32,5	≤ 52,5	≥ 75
32,5 R	≥ 10,0	-			
42,5 N	≥ 10,0	-	≥ 42,5	≤ 62,5	≥ 60
42,5 R	≥ 20,0	-			
52,5 N	≥ 20,0	-	≥ 52,5	-	≥ 45
52,5 R	≥ 30,0	-			

Evaluation:

The average compressive strength value of the produced cement mortars is obtained as 21.5 MPa at 2-days of curing age, considering all of the test results, the cement,

- ☐ Confirms the requirements given given in Table 2.4 for class 42.5 R.
- ☐ Does not conform the requirements given given in Table 2.4 for class 42.5 R **due to the**,
- compressive strength.
 - initial setting time.
 - both compressive strength and initial setting time.