Teede Tehnokeskus

EAK EN ISO/IEC 17025 L036

TEST REPORT NR 2411/23

01.09.2023 nr 7-6.4/2606

Client: Megatrade OÜ – Kaido Randalu

Samples:

Object -

Place of sampling -

Date of taking samples and sampler
,
-, -

Date of delivering samples and deliverer
22.08.2022 08:30,
K. Randalu, Megatrade OÜ

Clients marking of samples:
In table

Reg. Number in laboratory:
3988

Testing and results

Specimens were made according to EVS-EN 13286-2, using modified Proctor. Compaction was made with 4,5kg hammer in 5 layers and every layer got 25 blows. The falling height of the hammer was 457mm. After the compaction the specimens were covered in plastic to reduce the loss of moisture.
The compostion of the mix is shown in Table 1. Composition of mixes .
Half of the specimens for frost resistance were held in climate chamber and half were subjected to 10 cycles of freeze and thaw and after that they were held in climate chamber for one day before testing for compressive strength.
The specimens (2-1, 2-7, 4-5, 4-7) were held 28 days in a climate room in temperature 20±2 °C, relative humidity 65±5 %. After that the specimens in Table 2 were held wrapped in foil up to 26.04.2023. After 26.04.2023 these specimens were held submersible in bath with 1kg sea salt, 1l of engine oil and 1l of battery acid until testing (for 100 days).
The density of samples (without drying) was determined according to EVS-EN 12697-6 (method D). Compressive strength was determined according to *EVS-EN 13286-41.

*Test is not accredited by Estonian Accreditation Centre

Determination of particle size distribution:

Size of sieve (mm)	**31,5**	**20**	**16**	**12,5**	**8**	**6,3**	**4**	**2**	**1**	**0,5**	**0,25**	**0,125**
Mass passing sieve (%)	100	91	86	81	72	67	61	52	43	34	26	19
Content of fines (<0,063), f (%)					15,0							

Proctor:

Maximum dry density, ρ_d (Mg/m^3)	2,27
Optimum water content, w_0 (%)	4,8

Table 1. Composition of mixes

Reg nr	Laboratory designation	Material, %	Binder, %	Binder		Water, %
				Cement, %	Stabilroad, %	
3988	2	100	4	98	2	4,8
	4	100	4	98	2	4,8

The test results apply only to the tested samples

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METROSERT SERTIFITSEERITUD / CERTIFIED ISO 9001

Table 1. 7 days old when testing

Laboratory designation	Dimensions, mm		Mass, g	Date of testing	Age of test specimen, days	Density, kg/m³	Crushing force, kN	Compressive strength, N/mm²	Average compressive strength, N/mm²
	d	H							
2-11	99,8	120	2165	19.09.2022	7	2306	68,8	8,8	7,3
2-2	99,9	119,9	2195			2336	45,4	5,8	
4-3	100,2	120,4	2186			2302	57,3	7,3	6,9
4-12	100,3	119,9	2170			2291	50,8	6,4	

Table 2. 14 days old when testing

Laboratory designation	Dimensions, mm		Mass, g	Date of testing	Age of test specimen, days	Density, kg/m³	Crushing force, kN	Compressive strength, N/mm²	Average compressive strength, N/mm²
	d	H							
2-3	100	120,3	2230	26.09.2022	14	2360	58,9	7,5	6,6
2-9	100,1	119,9	2201			2333	44,4	5,6	
4-11	100	120,3	2182			2309	61,5	7,8	7,8
4-13	100,1	120,1	2181			2308	61,5	7,8	

Table 3. 28 days old when testing

Laboratory designation	Dimensions, mm		Mass, g	Date of testing	Age of test specimen, days	Density, kg/m³	Crushing force, kN	Compressive strength, N/mm²	Average compressive strength, N/mm²
	d	H							
2-1	100,1	120	2236	10.10.2022	28	2368	63,4	8,1	9,0
2-7	100,2	120,1	2246			2372	77,2	9,8	
4-5	100,1	120,2	2177			2301	86,7	11	10,9
4-7	100,1	120,2	2179			2304	84,4	10,7	

Table 4. Test results of frost resistance

Laboratory designation	Condition	Dimensions, mm		Mass, g	Date of testing	Age of test specimen, days	Density, kg/m³	Crushing force, kN	Compressive strength, N/mm²	Average compressive strength, N/mm²
		d	H							
Mixture 2	10 cycles of frost-thaw	100,3	120,4	2270	24.01.2023	120	2386	74,1	9,4	8,7
		100,5	120,5	2261			2365	63,1	8,0	
	Control bodies	100,4	120,1	2246			2362	66,2	8,4	8,2
		100,2	120,2	2238			2361	62,9	8,0	

Table 6. Test results for submersed specimens - 100 days in water to which 1 kg of sea salt, 1 liter of motor oil, 1 liter of battery acid (sulfuric acid) had been added

Laboratory designation	Dimensions, mm		Mass, g	Date of testing	Density, kg/m³	Crushing force, kN	Compressive strength, N/mm²
	d	H					
4-1**	99,6	121,2	2199	04.aug	2329	47,6	6,1
4-9	103	119,9	2182		2184	75,1	9
4-6*	99,9	120,1	2125	04.aug	2257	104,7	13,4

*Specimens were left to dry for 6 days in climate chamber
** the surface of the test object was inclined and uneven

Frost resistance with 4% of cement and 3% of saltwater

Testing and results

The specimens were held 28 days in a climate room in temperature 20±2 °C, relative humidity 65±5 %. Half of the specimens for frost resistance were held in climate chamber and half were subjected to 10 cycles of freeze and thaw and after that they were held in climate chamber for one day before testing for compressive strength. During thawing the specimens were submersed in 3% saltwater solution. The density of samples (without drying) was determined according to EVS-EN 12697-6 (method D). Compressive strength was determined according to *EVS-EN 13286-41.

Table 1. Composition of mixes

Reg nr	Material, %	Binder, %	Binder		Water, %
			Cement, %	Stabilroad, %	
3769	100	4	98	2	4,5

Table 2. Results of compressive strength before and after freeze-thaw cycles

Laboratory designation	Condition	Dimensions, mm		Mass, g	Density, kg/m³	Crushing force, kN	Compressive strength, N/mm²	Average compressive strength, N/mm²
		d	H					
1	Freeze-thaw cycled	150,8	118,0	4597	2181	212,4	11,9	**11,8**
2		150,6	100,0	3647	2047	217,9	12,2	
5		150,4	120,5	4588	2143	200,0	11,3	
3	Control specimens	150,7	121,0	4620	2141	197,3	11,1	**11,6**
4		150,1	121,0	4662	2177	210,3	11,9	
6		150,0	120,6	4663	2188	210,4	11,9	

3% and 4% of cement and at least 1 kg of StabilRoad – Compressive strenght after 28 days

Testing and results

After sealing, the specimens were covered with a film to prevent moisture loss. The composition of the mixtures is given in Table 1. Mixes Proportions
Before testing the specimens were stored in an air-conditioned room at a temperature of 20±2 °C, with a relational humidity of 65±5 %.
The volumetric mass of the sample bodies (without drying the specimen) was determined according to EVS-EN 12697-6 (Method D). Compressive strength was determined according to the principles of *EVS-EN 13286-41.

Table 1. Proportions of mixtures

Reg. No	Laboratory designation	Material %	Binder, %	Binder		Water, %
				Cement, %	Stabilroad, %	
5664	4	100	3	94	6	4,8
5665	3	100	4	95,5	4,5	4,8

Table 2. Compressive strength results

Laboratory designation	Dimensions of the specimen , Mm		Mass of the sample - body, g	Month of testing	Sample - body age, day	Density, kg/m3	Crushing force, kN	Compressive strength, N/mm2	Average compressive strength, N/mm2	Shattering image
	d	H								
5664 - 4	100,3	119,8	2140	12.12	28	2261	38,2	4,8	5,8	R
5665 - 3	100,3	120,0	2149			2267	53,2	6,7		R

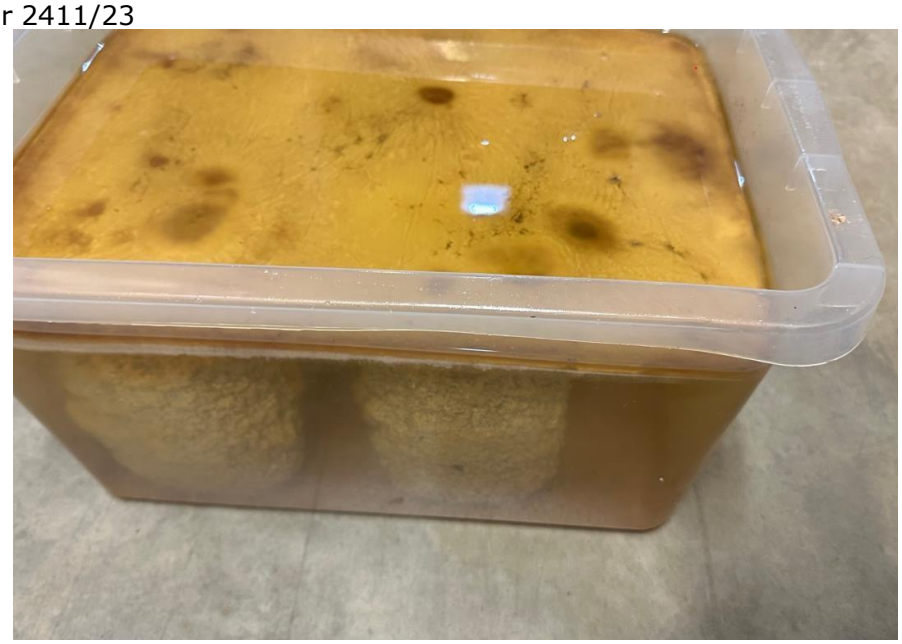

Figure 1. Submersed specimens

Figure 2. Specimens after submersing them