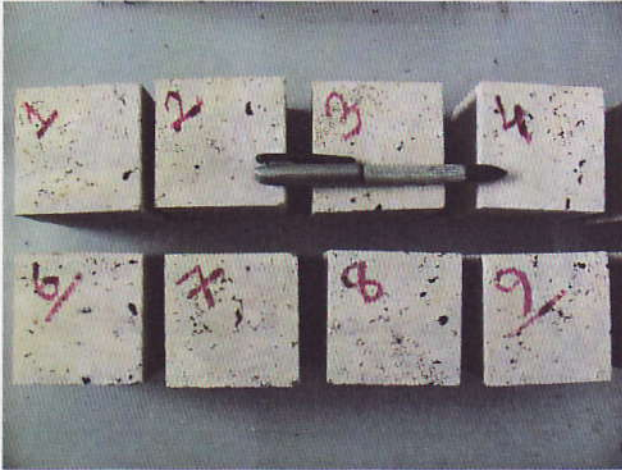




PAMUKKALE UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF GEOLOGICAL ENGINEERING
DENİZLİ - TURKEY

FREEZING TEST REPORT OF TRAVERTINE NATURAL STONE OF KÖMÜRÇÜOĞLU MARBLE CO.



Prepared By
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April - 2015
DENİZLİ



Date: 27.04.2015

Customer Name:	Kömürcüoğlu Mermer San. ve Tic. A.Ş.
Address:	Pamukkale Yolu, Korucuk Kasabası, Kömürcüoğlu Sok, DENİZLİ
Telephone:	00 90 258 279 21 32
Report Identification Number:	KMR - 2
Tested Material:	Travertine

Related Test Standard - 1: TS EN 12371 (2003)

Related Test Standard - 2: TS 699 (1987)

Loss of Apparent Volume:

Initial apparent volume: $V_{b0} = (M_{S0} - M_{h0})$

Apparent volume after n number freezing cycle: $V_{bn} = (M_{Sn} - M_{hn})$

Variation of apparent volume by percent were determined as follows equation;

$$\Delta V_b = \frac{V_{b0} - V_{bn}}{V_{b0}} * 100$$

In this equation;

M_{S0} = saturated weight before freezing test

M_{h0} = weight in water (saturated condition)

M_{Sn} = saturated sample weight after n cycle freezing test

M_{hn} = weight in water after n cycle freezing test

Decrease of apparent volume after **12 freezing cycle** were determined as follows;

Sample Num.	M_{S0} (g)	M_{h0} (g)	Sample Num.	M_{Sn} (g)	M_{hn} (g)	ΔV_b , %
1	823,56	463,7	5	821,11	462,5	0,3474
2	849,23	446,28	6	845,24	445,29	0,7445
3	820,23	454,11	7	818,86	453,89	0,3141
4	851,70	462,81	8	850,12	462,26	0,2649

Variations of uniaxial compressive strength after freezing were determined by using TS 699 (1987) standard. Experimental datas and average values are presented in Table 1 and Table 2.

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Table 1. Test data and average values before freezing test.

Sample Number	Dry Weight (gr)	Dry Unit Weight (gr/cm ³)	Uniaxial Compressive Strength, G ₀ (MPa)
1	852,83	2,40	47,23
2	856,23	2,40	45,17
3	1016,3	2,39	41,44
Average		2.39	44,61

Table 2. Test data and average values after freezing test.

Sample Number	Dry Weight (gr)	Dry Unit Weight (gr/cm ³)	Uniaxial Compressive Strength, G _k (MPa)
4	819,60	2,29	38,56
5	843,30	2,39	43,55
6	814,85	2,33	40,83
Average		2.34	40,98

$$\text{Loss of Strength (\%)} \Delta f = \frac{G_0 - G_k}{G_0} * 100$$

$$\frac{G_0 - G_k}{G_0} * 100 = \frac{44.61 - 40.98}{44.61} * 100 = 8.137$$

Loss of uniaxial compressive strength average value have been obtained as **8.137 %** by using above equation.

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