



**TSE DENEY ve KALİBRASYON MERKEZİ BAŞKANLIĞI**  
**Yapı Malzemeleri Laboratuvarı Gebze Müdürlüğü**

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**CONSTRUCTION MATERIALS LABORATORY (GEBZE)**

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**MUAYENE VE DENEY RAPORU**  
**TEST REPORT**

506328

12-19

<b>Deneysel Talep Eden/Firma</b>	:	TEPE BETOPAN YAPI MLZ.SAN.VE TİC.A.Ş.
(Adı,Adresi,Şehir vb.)		(TEPE BETOPAN YAPI MLZ.SAN.VE TİC.A.Ş.: BEYTEPE KÖYÜ YOLU NO 5
<b>Requesting/Customer</b>		BİLKENT --ANKARA)
(Name,Address, City etc.)		
<b>Deneysel Talep Tarihi/No</b>	:	16.12.2019 / 378023
<b>Order Date / No</b>		
<b>Numunenin Tanımı</b>	:	565759,ELYAF TAKVİYELİ ÇİMENTOLU DÜZ LEVHA, BETOPAN UNIQUE PRO , BETOPAN UNIQUE
(No,Cins, Marka, Tip, Tür, Model vb.)		PRO FLAT , - , - , 0,00 adet
<b>Sample Description</b> (No,Type,Mark,Model etc.)		565759,Fibre-cement flat sheets,BETOPAN UNIQUE PRO,BETOPAN UNIQUE PRO FLAT,-,-,0,00 item
<b>Numune Kabul Tarihi</b>	:	16.12.2019
<b>Test Item Receipt Date</b>		
<b>Deneyslerin Yapıldığı Tarih</b>	:	23.12.2019 - 23.12.2019
<b>Date of Test</b>		
<b>Uygulanan Standard / Metod</b>	:	TS EN 12467+A2:2018-11 Lifli çimentodan yapılmış düz levhalar - Mamul özellikleri ve deney yöntemleri
<b>Applied Standard/Method</b>		TS EN 12467+A2:2018-11 Fibre-cement flat sheets - Product specification and test methods
<b>Raporun Sayfa Sayısı</b>	:	4
<b>Number of pages of the report</b>		
<b>Açıklamalar</b>	:	
<b>Remarks</b>		This report is the translation of the test report with 05.09.2019 date and 486884 report number and the results in this report based on the results in the previous report in question. New test has not been conducted.
		Yukarıda tanımlanan numune için laboratuvarımızda yapılan muayene ve deneylerden YAPILAN DENEYLER YÖNÜYLE UYGUNDUR sonuç alınmış olup, ölçüm sonuçları müteakip sayfalarda verilmiştir.
		It has PASSED according to the tests that were made. The test results are given on the following pages.

Mühür  
Seal

Tarih  
Date



**Deneysel Sorumlusu**  
**Person in charge of tests**

*[Signature]*  
Fatma Nur ÇELİK  
Deney Personeli  
Testing Expert

**Kontrol Eden**  
**Reviewer**

*[Signature]*  
Murat GÜNDÜZ  
Teknik Şef V.  
Technical Chief Dep.

**Onaylayan**  
**Approved by**

*[Signature]*  
Murat GÜNDÜZ  
Laboratuvar Müdürü V.  
Laboratory Manager Dep.

Bu rapor, hazırlayan laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. İmzasız ve mühürsüz raporlar geçersizdir.

Bu rapor, sadece deneyi yapılan numune için geçerlidir ve "Ürün Belgesi" yerine geçmez.

This test report shall not be reproduced other than in full except with the written permission of the laboratory. Test reports without signature and seal are not valid.

This test report represents only tested sample(s), and shall not be used as Product Certificate



TEST RESULTS

Number	Requirements	Observed / Measured	Result																													
<b>5.4 Physical requirements and characteristics</b>																																
<b>5.4.4 Mechanical characteristics</b> Bending strength (MOR) Modulus of elasticity (MOE)	When tested as specified in 7.3.2, the minimum modulus of rupture of the sheets, expressed in megapascals, shall be as specified in Table 6. The MOR shall be the average of the values obtained from testing the samples in both directions. NOTE For non-homogeneous e.g. coated sheets, Table 6 refers to the apparent MOR. Category A and B sheet strengths are specified in the wet condition (see Table 10). Category C and D sheet strengths are specified in the ambient condition (see Table 10). The manufacturer shall specify the characteristic value for mechanical strength. Characteristic values of bending strength are based on statistical data on results of tests in ambient conditions. The statistical interpretation of test results is based on the procedure prescribed in EN 1990:2002, Eurocode — Basis of structural design, Table D.1, Vx, unknown). If a correlation has been established (see Annex B) between the MOR from production control and the MOR from products as delivered, the k-value of V x,known can be used. The minimum modulus of rupture of the sheets in the weaker direction shall be not less than 70 % of the specified value in Table 6 for the average of the two directions. This requirement does not apply to textured sheets. The modulus of elasticity of the sheets, expressed in Giga- or Megapascals, shall be specified on test results of tests in ambient conditions. The MOE shall be the average of the values obtained from testing the sampling in both directions with indication of the standard deviation. It is up to the manufacturer to determine the MOE for information purposes, i.e. with type testing.  <b>Table 6 — Minimum modulus of rupture (MOR)</b>  <table border="1"> <thead> <tr> <th colspan="2">min. MOR in the wet condition Mpa</th> <th colspan="2">min. MOR in the ambient laboratory conditions MPa</th> </tr> <tr> <th>Classes</th> <th>Categori A &amp; B</th> <th>Classes</th> <th>Categori C &amp; D</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4</td> <td>1</td> <td>4</td> </tr> <tr> <td>2</td> <td>7</td> <td>2</td> <td>7</td> </tr> <tr> <td>3</td> <td>13</td> <td>3</td> <td>10</td> </tr> <tr> <td>4</td> <td>18</td> <td>4</td> <td>16</td> </tr> <tr> <td>5</td> <td>24</td> <td>5</td> <td>22</td> </tr> </tbody> </table> Where manufacturers state minimum product MOR this should be at the 4 % acceptable quality level (AQL). NOTE For textured sheets, the MOR cannot be used for calculating mechanical performance.	min. MOR in the wet condition Mpa		min. MOR in the ambient laboratory conditions MPa		Classes	Categori A & B	Classes	Categori C & D	1	4	1	4	2	7	2	7	3	13	3	10	4	18	4	16	5	24	5	22	<b>Bending Strength MOR (MPA)</b>		<b>C</b>
		min. MOR in the wet condition Mpa		min. MOR in the ambient laboratory conditions MPa																												
		Classes	Categori A & B	Classes	Categori C & D																											
		1	4	1	4																											
		2	7	2	7																											
		3	13	3	10																											
		4	18	4	16																											
		5	24	5	22																											
		Declared Value : Wet condition Category A Class 3																														
		Sample No	Direction 1	Direction 2	Average																											
		1	20,59	10,49	15,54																											
		2	23,06	10,80	16,93																											
		3	21,48	12,39	16,93																											
4	20,34	10,42	15,38																													
5	18,96	9,82	14,39																													
Avr.	20,89	10,78	15,84																													
Requirement of the standard for Average Modulus of rupture in both directions (MOR)			13																													
Measured Value for Average Modulus of rupture in both directions (MOR)			15,84																													
Declared Characteristic Value of Bending Strength			13,00																													
Measured Characteristic Value of Bending Strength			13,28																													
Requirement of the standard for Minimum Modulus of rupture for bending ( 70 % of the specified value in Table 6)			9,10																													
Measured Value Of Minimum Modulus Rupture For Bending			9,82																													







TEST RESULTS

5.4.2 Apparent density	The manufacturer shall specify in his literature the minimum apparent density for each category and each class of sheet. When tested in accordance with the method specified in 7.3.1, the density shall be not less than this value.	Sample No. Apparent Density (g/cm <sup>3</sup> )		C
		Declared Value	Minimum 1	
		1	1,27	
		2	1,27	
		3	1,27	
		Average	1,27	
5.4.3 Moisture movement	The manufacturer's literature shall state the percentage value of linear sheet moisture movement measured when the sheet is exposed to a relative humidity change from 30 % to 90 %. The stated value shall be determined in accordance with 7.3.7 using the test method given in Annex C.	Sample No. Moisture Movement (%)		C
		Declared Value	Maximum 0,10	
		1	0,07	
		2	0,07	
		Average	0,07	
5.4.5 Water impermeability for Categories A, B and D	When tested in accordance with 7.3.3, traces of moisture may appear on the under face of the sheet, but in no instance shall there be any formation of drops of water.	Sheets tested in according with 7.3.3, traces of moisture and formation of drops of water did not appear on the under face of the sheet.		C
5.4.6 Water vapour permeability for Category D	For flat sheets used as rigid underlays, the water vapour resistance value $\mu$ shall be determined according to 7.3.4 and shall be specified in the manufacturer's literature. The $\mu$ value obtained from the test shall not be higher than the value specified by the manufacturer.r.	---		NA
5.5.2 Freeze-thaw for Categories A, B and D	When tested in accordance with 7.4.1, after 100 freeze-thaw cycles for Category A and 25 cycles for Category B and D, the ratio RL as defined in 7.4.1.4 shall be not less than 0,75.	RL: 0,91		C
5.5.4 Warm water for Categories A, B, C and D	When tested in accordance with 7.3.5, after 56 days at 60 °C, the ratio RL as defined in 7.3.5.4 shall be not less than 0,75.	RL: 0,82		C
5.5.5 Soak-dry for Categories A, B, C and D	When tested in accordance with 7.3.6, after 50 soak-dry cycles for Category A and 25 cycles for Categories B, C and D the ratio RL as defined in 7.3.6.4 shall be not less than 0,75.	RL: 0,93		C





## TEST RESULTS

<b>5.7 Product information</b>	The manufacturer shall include the following in his literature: a) designation of the sheet: 1) type of product: NT (see 5.1.1); 2) name of the sheet; 3) category; 4) class; 5) level of tolerances. b) nominal values for: 1) thickness; 2) length and width. c) minimum apparent density; d) instructions relevant to the handling and installation.	-----	-----
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Used Abbreviations	Meaning of Abbreviations
C	This result complies with the stated condition(s)
NC	This result does not comply with the stated condition(s)
NR	This test is not requested
NA	This test is not applicable for this sample
X	This test could not be done with the capability of the laboratory
ND	This Test is not evaluated since declaration/conditions are not stated
EB	This test is not done due to the breakdown of the equipment

