



GFRP Bars Axial Tensile Test

According to ECP 208-2019 and ASTM D7205-21

Project Name:	مصنع تدوير المخلفات	Tested By:	Eng. Adham El-Tonsi
Location:	شبراخيت - جيزة	Checked By:	Dr. Hassan Ahmed
Owner:	وزارة التنمية المحلية	Report No.	SHBRMNT-GFRP-AT-001
Consultant:	استشاري المقاول: مكتب كيمونكس الاستشاري العام: الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري	Delivery Date:	28-Sep-2025
Sample Details:	6.0 mm Diameter GFRB Bar	Report Date:	2-Oct-2025
Client Requirements:	اجراء اختبار الشد المحوري لعدد 3 عينات أسياخ GFRP	Client(s):	مقاول / شركة محيط للمقاولات

A- Axial Tensile Test

According to ECP 208-2019

Egyptian Code for Design Principles and Construction Requirements for the Use of Fiber-Reinforced Polymers in Construction

According to ASTM D7205-21

Standard Test Method for Tensile Properties of Fiber Reinforced Polymer Matrix Composite Bars

Specimen Number:	1	2	3	Limits
Manufacturer	Terratech			
Nominal Diameter (d_n , mm)	6	6	6	
Measured Diameter (d_i , mm)	6.60	6.60	7.00	
Overall Length (L_T , mm)	881	890	892	
Anchor Length (L_a , mm)	300	300	300	
Free Length (L_f , mm)	281	290	292	380mm or $40 \cdot d_n$
Gauge Length (L_g , mm)	240	240	240	
Nominal Area (A_n , mm ²)	28.27	28.27	28.27	
Measured Area (A_i , mm ²)	34.21	34.21	38.48	
Ultimate Load (P_{max} , ton)	2.84	2.82	2.93	
Final Length (L_f , mm)	278	272	274	
Tensile Strength (σ_{max} , N/mm ²)	1004.44	997.37	1036.28	
Elongation After Fracture (ϵ_{max} , %)	15.83	13.33	14.17	

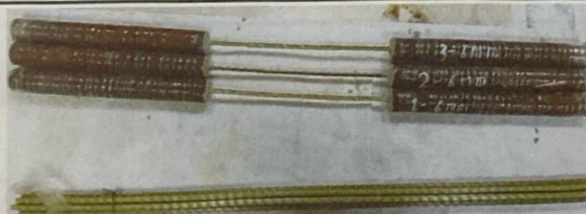


Fig. 1: Tested Samples with Installed Anchors Before Testing

Tested By

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Location:	شبراخيت - جيزة	Checked By:	Dr. Hassan Ahmed
Owner:	وزارة التنمية المحلية	Report No.	SHBRMNT-GFRP-AT-002
Consultant:	استشارى المقاول: مكتب كيمونكس الاستشارى العام: الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري	Delivery Date:	28-Sep-2025
Sample Details:	8.0 mm Diameter GFRB Bar	Report Date:	2-Oct-2025
Client Requirements:	اجراء اختبار الشد المحورى لعدد 3 عينات أسياخ GFRP	Client(s):	مقاوله / شركة محيط للمقاولات

A- Axial Tensile Test

According to ECP 208-2019

Egyptian Code for Design Principles and Construction Requirements for the Use of Fiber-Reinforced Polymers in Construction

According to ASTM D7205-21

Standard Test Method for Tensile Properties of Fiber Reinforced Polymer Matrix Composite Bars

Specimen Number:	1	2	3	Limits
Manufacturer	Terratech			
Nominal Diameter (d_n , mm)	8	8	8	
Measured Diameter (d_i , mm)	8.90	8.90	8.90	
Overall Length (L_T , mm)	872	885	882	
Anchor Length (L_a , mm)	300	300	300	
Free Length (L_f , mm)	272	285	282	380mm or $40 \cdot d_n$
Gauge Length (L_g , mm)	320	320	320	
Nominal Area (A_n , mm ²)	50.27	50.27	50.27	
Measured Area (A_i , mm ²)	62.21	62.21	62.21	
Ultimate Load (P_{max} , ton)	5.05	5.09	5.12	
Final Length (L_F , mm)	360	366	363	
Tensile Strength (σ_{max} , N/mm ²)	1004.67	1012.62	1018.59	
Elongation After Fracture (ϵ_{max} , %)	12.50	14.38	13.44	



Fig. 1: Tested Samples with Installed Anchors Before Testing

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GFRP Bars Pull-Out Test

According to ECP 208-2019 and ASTM D7913-20

Project Name:	مصنع تدوير المخلفات	Tested By:	Eng. Adham El-Tonsi
Location:	شبراخيت - جيزة	Checked By:	Dr. Hassan Ahmed
Owner:	وزارة التنمية المحلية	Report No.:	SHBRMNT-GFRP-PT-001
Consultant:	استشارى المقاول: مكتب كيمونكس الاستشارى العام: الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري	Delivery Date:	28-Sep-2025
Sample Details:	6.0 mm Diameter GFRB Bar	Report Date:	12-Oct-2025
Client Requirements:	اجراء اختبار تحديد مقاومة التماسك مع الخرسانة بالمعمل لعدد 3 عينات أسياخ GFRP	Client(s):	مقولة / شركة محيط للمقاولات

A- Pull-Out Test

According to ECP 208-2019

Egyptian Code for Design Principles and Construction Requirements for the Use of Fiber-Reinforced Polymers in Construction

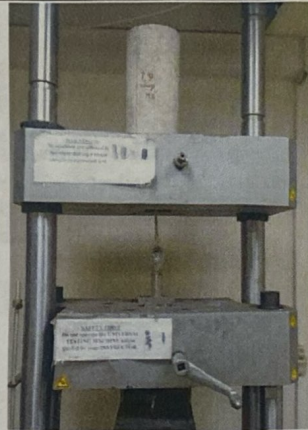
According to ASTM D7913-20

Standard Test Method for Bond Strength of Fiber-Reinforced Polymer Matrix Composite Bars to Concrete by Pullout Testing

Specimen Number:	1	2	3
Manufacturer	Terratech		
Nominal Diameter (d_n , mm)	6	6	6
Anchor Length (L_a , mm)	300	300	300
Free Length (L_f , mm)	300	300	300
Embedded Length (L_e , mm)	300	300	300
Nominal Area (A_n , mm ²)	28.27	28.27	28.27
Concrete Compressive Strength @ Day of Testing (F_{cu} , N/mm ²)	25.8	25.8	25.8
Test Loading Rate (kN/min)	20	20	20
Ultimate Load (F_{max} , kN)	38.09	35.17	38.36
Bond Strength (τ , N/mm ²)	6.74	6.22	6.78
Failure Mode	Bar Failure	Bar Failure	Bar Failure



(a)



(b)



(c)

Fig. 1: (a) Prepared samples for testing, (b) A sample during testing, and (c) Samples after testing

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GFRP Bars Pull-Out Test

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Location:	شبراخيت - جيزة	Checked By:	Dr. Hassan Ahmed
Owner:	وزارة التنمية المحلية	Report No.	SHBRMNT-GFRP-PT-002
Consultant:	استشارى المقاول: مكتب كيمونكس الاستشارى العام: الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري	Delivery Date:	28-Sep-2025
Sample Details:	8.0 mm Diameter GFRB Bar	Report Date:	12-Oct-2025
Client Requirements:	GFRP اختبار تحديد مقاومة التماسك مع الخرسانة بالمعمل لعدد 3 عينات أسياخ	Client(s):	مقولة / شركة محيط للمقاولات

A- Pull-Out Test	According to ECP 208-2019 Egyptian Code for Design Principles and Construction Requirements for the Use of Fiber-Reinforced Polymers in Construction
	According to ASTM D7913-20 Standard Test Method for Bond Strength of Fiber-Reinforced Polymer Matrix Composite Bars to Concrete by Pullout Testing

Specimen Number:	1	2	3
Manufacturer	Terratech		
Nominal Diameter (d_n , mm)	8	8	8
Anchor Length (L_a , mm)	300	300	300
Free Length (L_f , mm)	300	300	300
Embedded Length (L_e , mm)	300	300	300
Nominal Area (A_n , mm ²)	50.27	50.27	50.27
Concrete Compressive Strength @ Day of Testing (F_{cu} , N/mm ²)	25.8	25.8	25.8
Test Loading Rate (kN/min)	20	20	20
Ultimate Load (F_{max} , kN)	67.41	66.65	66.56
Bond Strength (T , N/mm ²)	8.94	8.84	8.83
Failure Mode	Bar Failure	Bar Failure	Bar Failure



(a)



(b)

Fig. 1: (a) Prepared samples for testing, and (b) Samples after testing

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Chemical Resistance of GFRB Bars

For Use in Concrete Structural Members

Project Name:	مصنع تنوير المخلفات	Tested By:	Eng. Adham El-Tonsi
Location:	شيراتنت - جيزة	Checked By:	Dr. Hassan Ahmed
Owner:	وزارة التنمية المحلية	Report No.	SHBRMNT-GFRP-CAT-001
Consultant:	استشارى المقاول: مكتب كيمونكس الاستشارى العام: الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري	Date:	4-Oct-2025
Sample Details:	6.0 mm Diameter GFRB Bar		
Client Requirements:	اجراء اختبار مقاومة الكيماويات لعينات أسياخ GFRP	Client(s):	مقاوله / شركة محيط للمقاولات

1- تحديد محتوى أملاح الكلوريدات والكبريتات:

Chemical Solution	Mass Before Testing gm	Mass After Testing gm	Mass Loss %	Average Mass Loss %
HCl 30%	7.5536	7.5526	0.0132	0.0144
	8.0024	8.0013	0.0137	
	6.1358	6.1348	0.0163	
H ₂ SO ₄ 30%	6.0121	6.011	0.0183	0.0177
	5.9997	5.9985	0.0200	
	7.3652	7.3641	0.0149	
NaOH 40 gm/L	7.7753	7.774	0.0167	0.0152
	7.0044	7.0035	0.0128	
	6.8937	6.8926	0.0160	
MgSO ₄ 10%	6.2341	6.2332	0.0144	0.0165
	6.7982	6.7971	0.0162	
	8.0028	8.0013	0.0187	
NaCl 10%	5.4152	5.4147	0.0092	0.0103
	6.0019	6.0011	0.0133	
	6.0088	6.0083	0.0083	

ملاحظات:

النتائج الموضحة تسرى فقط على العينات الموردة للمعمل من العميل طالب الاختبار.
النتائج المقدمة تسرى فقط على العينات الموردة، ولا تعتبر اعتماد لانتاج كمي.
تم غمر العينات في المحاليل المذكورة بالجدول لمدة 48 ساعة في درجة حرارة 23±°C

التوصيات:

على الجهات المشرفة على المشروع سحب عينات للاختبار من كلوريد الموقع للتأكد من مطابقة ما يورد بالعينات المختبرة.
الفاقد في الوزن بعد التعرض للكيماويات لمدة 48 ساعة يعتبر مقبولا.

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أدهم السيد

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Chemical Resistance of GFRB Bars

For Use in Concrete Structural Members

Project Name:	مصنع تكوين المخلفات	Tested By:	Eng. Adham El-Tonsi
Location:	شيراتين - جيزة	Checked By:	Dr. Hassan Ahmed
Owner:	وزارة التنمية المحلية	Report No.	SHBRMT-GFRP-CH-RT-002
Consultant:	استشارى المقاول: مكتب كيمونكس الاستشارى العام: الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري	Date:	4-Oct-2025
Sample Details:	8.0 mm Diameter GFRB Bar		
Client Requirements:	اجراء اختبار مقاومة الكيماويات لعينات أسياخ GFRP	Client(s):	مقاول / شركة محيط للمقاولات

1- تحديد محتوى أملاح الكلوريدات والكبريتات:

Chemical Solution	Mass Before Testing gm	Mass After Testing gm	Mass Loss %	Average Mass Loss %
HCl 30%	4.9813	4.9804	0.0181	0.0180
	6.2541	6.2532	0.0144	
	5.5552	5.554	0.0216	
H ₂ SO ₄ 30%	8.9314	8.9301	0.0146	0.0138
	8.1314	8.1302	0.0148	
	9.0063	9.0052	0.0122	
NaOH 40 gm/L	8.3266	8.3258	0.0096	0.0129
	7.6057	7.6046	0.0145	
	7.5216	7.5205	0.0146	
MgSO ₄ 10%	7.4441	7.4435	0.0081	0.0095
	7.8725	7.8718	0.0089	
	7.005	7.0042	0.0114	
NaCl 10%	9.101	9.1001	0.0099	0.0089
	9.0016	9.0011	0.0056	
	8.0364	8.0355	0.0112	

ملاحظات:

النتائج الموضحة تسرى فقط على العينات الموردة للمعمل من العميل طالب الاختبار.
النتائج المقدمة تسرى فقط على العينات الموردة، ولا تعتبر اعتماداً لنتائج كمي.
تم غمر العينات في المحاليل المذكورة بالجدول لمدة 48 ساعة في درجة حرارة 23 ± °C

التوصيات:

على الجهات المشرفة على المشروع سحب عينات للاختبار من كلوريد الموقع للتأكد من مطابقة ما يورد بالعينات المختبرة.
التفاد في الوزن بعد التعرض للكيماويات لمدة 48 ساعة يعتبر مقبولا.

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