

**Test Performed By: Dr. Wasim Abbas**

Khan Zaman Leghari

Construction Manager

NESPAK-ELECTRA-ICS Joint Venture Consultants.

(Remodeling of Warsak Canal System in Peshawar and Nowshera Districts Contract No. RWCS-01 Construction of Auxiliary Irrigation Tunnel and Allied Structures)

Subject: **REPORT OF FLEXURAL TOUGHNESS**

This is with reference to your letter No. 3379/066/KZL/01/2306 dated:10-01-2024 and SOM receipt No. 3487 dated: 11-01-2024. The prismatic samples of Fiber Reinforced Shotcrete beams submitted in the Laboratory were tested to determine their Flexural Toughness as per **ASTM C 1018**. The values of toughness indices exhibited by each sample is provided in the Table below. It is to be noted that each test was stopped once the drop in the load after peak was 90% of ultimate load carrying capacity.

Sr. No.	Sample Description with respect to Steel Fiber Dosage	Size of Test Specimen (Dimensions in mm)	Flexural Toughness Index I <sub>5</sub>	Flexural Toughness Index I <sub>10</sub>
1	50 kg/m <sup>3</sup>	100 × 100 × 350	4.9	7.1
2	50 kg/m <sup>3</sup>		3.5	4.9
3	50 kg/m <sup>3</sup>		3.1	4.2

Test Performed by: .Dr Asad Ali Gillani

Muhammad Sultan

Material Engineer

BSM Developers NMC Gujar Khan.

Client Reference No.: NMC/GK/196/2024

SOM Lab Ref: CED/SOM/3652(Page 1/1)

Dated: 23-01-2024

Dated: 14-02-2024

Test Type: Tensile Test

Sample Type: Galvanized Iron Pipe (Dia 20mm & 15mm)

Gauge Length: 2 inches

### Tensile Test Results

Sr. No.	Sample Type	Size of strip (mm)	X Section Area (mm <sup>2</sup> )	Ultimate Load (kN)	Ultimate Tensile Stress (MPa)	Elongation (inch)	% Elongation
1	Pipe 20mm	23.0 x 3.1	71.30	29.5	413.74	0.5	25.0
2	Pipe 20mm	23.0 x 3.1	71.30	29.7	416.55	0.4	20.0
3	Pipe 15mm	16.0 x 2.7	43.20	18.7	432.35	0.3	15.0
4	Pipe 15mm	15.8 x 2.7	42.66	18.7	438.35	0.3	15.0

**Test Performed By:** Dr. Syed Asad Ali Gillani

Misha Asad  
Manager Proposal & Contracts  
Fibre Craft Industries Lahore

**Client Reference:** FCI/24/CR/22414

Dated: 14-02-2024

**SOM Laboratory Reference:** CED/SOM/3654(Page-1/1)

Dated: 14-02-2024

**Test:** Tensile Test

**Sample Type:** Fiberglass Filament Wound Tank

### Tensile Test

Sample Type	Size of Sample (mm)	Ultimate Load (kN)	Ultimate Stress (MPa)
Fiberglass	25.8 x 10.8	69.0	247.63
Fiberglass	24.8 x 10.75	79.7	298.95
Fiberglass	26.5 x 10.0	79.0	298.11

**Note:** Please always confirm the results of above report on web: [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Test Performed by: S. Asad Ali Gillani

Malik Riaz  
Manager Technical  
Bin Tariq Pvt Ltd.  
Lahore.

**Client Reference No.:** BTPL/Sale/CD/24-169

Dated: 14-02-2024

**SOM Lab Ref:** CED/SOM/3655(Page 1/1)

Dated: 14-02-2024

**Test Type:** Axial Tensile Coupling for Threaded Joint

**Sample Type:** Fiberglass Strainer Pipe Coupling Threaded Joint  
(Nominal Diameter 200mm Wall Thickness 12mm)

### Load Test Results

Sr No.	Sample Type	Ultimate Breaking Load (kN)	Remarks
1	Fiberglass Strainer Pipe Coupling Threaded Joint (Axial Tension)	203.2	Coupling threaded Joint remains safe at this load, but Pipe breaks from the drilled holes done in the pipe for the attachment of assembly

**Note:** Please always confirm the results on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Test Performed by: S. Asad Ali Gillani

Muhammad Saif  
Linker Developers (Pvt.) Ltd  
Lahore

(Construction of Warehouse)

Client Reference No.: LINKER/24/02/015

SOM Lab Ref: CED/SOM/3664 (Page 1/1)

Dated: 14-02-2024

Dated: 14-02-2024

Test Type: Tensile Test

Sample Type: MS Sheet

### Tensile Test Results

Sr. No.	Sample Type	Size of strip (mm)	X Section Area (mm <sup>2</sup> )	Yield Load (kN)	Ultimate Load (kN)	Yield Stress (MPa)	Ultimate Tensile Stress (MPa)	Elongation (inch)	% Elongation
1	Ms Sheet (10mm)	21.1 x 10.1	213.11	90.2	119.5	423.26	560.74	0.40	40.00
2	Ms Sheet (5mm)	20.1 x 5.5	110.55	48.5	62.5	438.72	565.36	0.40	40.00

Note: Please always confirm the results on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Gul Waqas Shahid

Test Performed By:

Dr. /Engr.

Nauman Khurram

Unirazz Services Lahore.(Const Of PRPL Office Building 4 Ph 1 at Packages, Lahore)

Client Reference: USPL/PRPL/1202-1

Dated: 12-02-2024

SOM Lab Ref: CED/SOM/3658(Page-1/1)

Dated: 14-02-2024

Test: Tension Test & Bend Test

Test Specification:

ASTM-A 615

Sample Type:

Deformed Bar

Gauge Length:

200 mm

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	kg/m	mm	mm	mm <sup>2</sup>	mm <sup>2</sup>	kN	kN	MPa	MPa	MPa	MPa	mm	mm	%	
1	3.892	25	25.13	491	496	262.00	343.20	534	529	699	692	40.0	200	20.0	
2	3.847	25	24.98	491	490	264.70	346.20	539	541	705	707	35.0	200	17.5	
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**BEND TEST:**

25mm	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Three Samples Received and Tested

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Muhammad Umar

Test Performed By: Dr. /Engr.

Nauman  
Khurram

Dy Dir (Maint) NHA,Lahore.(Const. Of Pedestrian Overhead Steel Bridge along With Motorcyclist RMP)

Client Reference: HS-PN-22-05-  
04/DD(M)/NHA/LHR/23/1202

SOM Lab  
Ref: 3653 (Page-1/1)

Dated: 14-09-2023

Dated: 14-02-2024

Test: Tension Test & Bend Test

Test Specification: ASTM-A-615

Gauge Length: 8 inch

Sample Type: Deformed Bar

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	1.058	5	0.629	0.31	0.311	10.47	14.02	74480	74240	99720	99400	1.30	8.0	16.3	
2	1.059	5	0.629	0.31	0.311	10.45	13.93	74340	74100	99140	98820	1.20	8.0	15.0	
3	0.668	4	0.500	0.20	0.196	6.65	9.40	73290	74790	103640	105760	1.10	8.0	13.8	
4	0.666	4	0.500	0.20	0.196	6.78	9.50	74750	76280	104770	106900	1.00	8.0	12.5	
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**BEND TEST:**

# 5	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Six Samples Received and Tested
# 4	Sample bend through 180 degrees Satisfactorily without any crack	

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Muhammad Mohsin

Test Performed By: Dr. /Engr. Nauman Khuram

RE NESPAK Lhr.(Strom Water Drainage system From Sham Nagar To River Ravi Lhr)(Pkg-II)

Client Reference: 3882/11/MM/01/348

SOM Lab

Ref: 3656 (Page-1/1)

Dated: 13-02-2024

Dated: 14-02-2024

Test: Tension Test & Bend Test

Test Specification: ASTM-A-615

Gauge Length: 8 inch

Sample Type: Deformed Bar

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	1.049	5	0.626	0.31	0.308	10.62	12.97	75570	76060	92250	92850	1.50	8.0	18.8	
2	1.053	5	0.627	0.31	0.309	10.65	12.90	75790	76030	91740	92040	1.50	8.0	18.8	
3	0.672	4	0.501	0.20	0.197	5.91	8.99	65200	66190	99150	100660	1.20	8.0	15.0	
4	0.667	4	0.500	0.20	0.196	6.60	10.14	72730	74210	111850	114130	1.10	8.0	13.8	
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**BEND TEST:**

# 5	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Six Samples Received and Tested
# 4	Sample bend through 180 degrees Satisfactorily without any crack	

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)



Faisal Bhatti

PM Const. Ittefaq Building Solution (Pvt)Ltd.(Mr.Chughtai House Lahore Cantt)

Test Performed By:

Dr. /Engr.

Nauman  
Khurram

Client Reference: IBS

Dated: 14-02-2024

Test: Tension Test & Bend Test

Gauge Length: 8 inch

SOM Lab

Ref:

3657 (Page-1/1)

Dated:

14-02-2024

Test Specification:

ASTM-A-615

Sample Type:

Deformed Bar

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	2.631	8	0.992	0.79	0.773	25.23	35.85	70440	71980	100090	102290	1.20	8.0	15.0	
2	2.628	8	0.991	0.79	0.772	24.84	35.65	69350	70970	99520	101840	1.40	8.0	17.5	
3	2.639	8	0.994	0.79	0.776	25.15	35.95	70210	71470	100370	102180	1.50	8.0	18.8	
4	1.483	6	0.745	0.44	0.436	13.37	18.57	67040	67650	93100	93950	1.40	8.0	17.5	
5	1.483	6	0.745	0.44	0.436	14.32	19.52	71790	72450	97850	98750	1.20	8.0	15.0	
6	1.482	6	0.745	0.44	0.436	14.39	19.42	72150	72810	97340	98230	1.20	8.0	15.0	
7	0.672	4	0.501	0.20	0.197	6.52	8.84	71940	73040	97460	98940	1.20	8.0	15.0	
8	0.666	4	0.500	0.20	0.196	6.54	8.82	72170	73640	97230	99220	1.20	8.0	15.0	
9	0.670	4	0.501	0.20	0.197	6.42	8.79	70820	71900	96900	98370	1.10	8.0	13.8	
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**BEND TEST:**

# 8	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Twelve Samples Received and Tested
# 6	Sample bend through 180 degrees Satisfactorily without any crack	
# 4	Sample bend through 180 degrees Satisfactorily without any crack	

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Naveed Ahmad  
Asst Dir Lab DHA Bahawalpur Cantonment.(M/S Pelican Mall)

Test Performed By: Dr. /Engr.

Nauman  
Khurram

Client Reference: 530/QC/MTL

Dated: 12-02-2023

Test: Tension Test & Bend Test

Gauge Length: 8 inch

SOM Lab

Ref: 3659 (Page-1/1)

Dated: 14-02-2024

Test Specification: ASTM-A-615

Sample Type: Deformed Bar (Kamran Steel)

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	2.618	8	0.990	0.79	0.769	25.28	33.86	70580	72510	94540	97120	1.60	8.0	20.0	
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**BEND TEST:**

# 8	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Two Samples Received and Tested

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

M.Mudassar  
Klash Pvt Ltd Faisalabad.

Test Performed By: Dr. /Engr. Asad Ali Gillani

Client Reference: Nil

SOM Lab

Ref: 3660 (Page-1/1)

Dated: 13-02-2024

Dated: 14-02-2024

Test: Tension Test & Bend Test

Test Specification:

ASTM-A-615

Gauge Length: 8 inch

Sample Type:

Deformed Bar

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	2.690	8	1.004	0.79	0.791	27.47	37.67	76700	76600	105150	105020	1.30	8.0	16.3	
2	2.647	8	0.995	0.79	0.778	26.12	36.44	72910	74040	101740	103310	1.40	8.0	17.5	
3	0.663	4	0.498	0.20	0.195	6.75	9.12	74420	76320	100610	103190	1.20	8.0	15.0	
4	0.587	4	0.469	0.20	0.173	5.68	7.70	62610	72390	84870	98120	1.30	8.0	16.3	
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**BEND TEST:**

# 8	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Six Samples Received and Tested
# 4	Sample bend through 180 degrees Satisfactorily without any crack	

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Ghulam Mustafa Kamal Pasha

Test Performed By: Dr. /Engr.

Nauman  
Khurram

ARE Nespak PRSWSSP,Rojhan.(PRSWSSP EDCS Cluster South-III,Tehsil Rojhan Pkg ROJ-01)

**SOM Lab**

**Client Reference:** NESPAK(PRSWSSP)ROJHAN RE 01-004

**Ref:** 3661 (Page-1/1)

**Dated:** 25-01-2024

**Dated:** 14-02-2024

**Test:** Tension Test & Bend Test

**Test Specification:** ASTM-A-615

**Gauge Length:** 8 inch

**Sample Type:** Deformed Bar (Markhor Steel)

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	0.670	4	0.501	0.20	0.197	7.05	9.40	77790	78970	103640	105220	1.10	8.0	13.8	
2	0.669	4	0.501	0.20	0.197	7.26	9.99	80040	81260	110160	111840	1.00	8.0	12.5	
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**BEND TEST:**

# 4	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Three Samples Received and Tested

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

AF Steel  
Lahore.

Test Performed By:

Dr. /Engr.

Nauman  
Khurram

Client Reference: Nil

Dated: 14-02-2024

Test: Tension Test & Bend Test

Gauge Length: 8 inch

SOM Lab

Ref: 3662 (Page-1/1)

Dated: 14-02-2024

Test Specification:

ASTM-A-615

Sample Type:

Deformed Bar

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	2.639	8	0.994	0.79	0.776	24.99	33.84	69780	71040	94480	96190	1.30	8.0	16.3	
2	1.501	6	0.749	0.44	0.441	15.82	21.02	79300	79120	105360	105120	1.10	8.0	13.8	
3	1.035	5	0.622	0.31	0.304	10.14	13.25	72160	73590	94280	96140	1.10	8.0	13.8	
4	0.658	4	0.496	0.20	0.193	6.95	8.87	76660	79450	97800	101340	1.00	8.0	12.5	
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**BEND TEST:**

--	No Bend test performed	<b>Note:-</b>  Only Four Samples Received and Tested

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)

Sub Divisional officer,

Test Performed By:

Dr. /Engr.

Nauman  
Khurram

BSD No.15,Lhr.(Const Of Masjid at Distt & Session Judge Block New Judicial Complex Phase-I,Lhr)

**SOM Lab**

Client Reference: 151

Ref:

3663 (Page-1/1)

Dated: 09-02-2024

Dated:

14-02-2024

Test: Tension Test & Bend Test

Test Specification:

ASTM-A-615

Gauge Length: 8 inch

Sample Type:

Deformed Bar

S.No.	Weight	Dia.		Area		Yield Load	Ultimate Load	Yield Stress		Ult. Stress		Elongation	Gauge Length	%age Elongation	Remarks
		Nominal	Calculated	Nominal	Calculated			(according to nominal area)	(according to measured area)	(according to nominal area)	(according to measured area)				
	lb/ft	#	in	in <sup>2</sup>	in <sup>2</sup>	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	2.651	8	0.996	0.79	0.779	25.59	35.93	71430	72440	100320	101730	1.60	8.0	20.0	
2	1.480	6	0.744	0.44	0.435	13.78	19.29	69080	69880	96670	97780	1.50	8.0	18.8	
3	0.669	4	0.501	0.20	0.197	7.08	8.79	78130	79320	96900	98370	1.20	8.0	15.0	
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

**BEND TEST:**

# 8	Sample bend through 180 degrees Satisfactorily without any crack	<b>Note:-</b>  Only Six Samples Received and Tested
# 6	Sample bend through 180 degrees Satisfactorily without any crack	
# 4	Sample bend through 180 degrees Satisfactorily without any crack	

Note: Please always confirm the results of above report on web [www.uet-civil.edu.pk](http://www.uet-civil.edu.pk)