



STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

Ref: CED/TFL/10/4082
2023

Dated: 19-10-

Dated of Test: 27-10-2023

To

Project Manager
Urban City Lahore
(Urban City Muridke)

Subject: **TESTING OF R.C.C. PIPE [ASTM-C76 - 08a]**

Reference to your letter No. 05, dated 19.10.2023 on the subject cited above. One R.C.C. Pipe as received by us has been tested. The results are tabulated as under.

Sr. No	Nominal Size	Total Length	Loaded Length	External Diameter	Internal Diameter	Wall Thickness	Proof load	Ultimate Load	Proof Stress	Ultimate Stress
	(inch)	(foot)	(foot)	(inch)	(inch)	(inch)	(kg)	(kg)	Pound/Linear foot/foot	Pound/Linear foot/foot
1	12	7.72	7.30	15.91	11.94	1.98	14500	18000	4402	5465

I/C Testing Laboratoires
UET Lahore, Pakistan.

Note:

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,

Construction Manager
 Barqaab Consulting Services (Pvt) Limited
 Procurement of Plant, Design, Supply, Installation, Testing and Commissioning of
 500/220/132kV Lahore North Substation and Extension Works at 500/220/132kV Nokhar
 Substation Under ADB Loan-3677-Pak Second Power Transmission Enhancement
 Investment Program Trench-III.

Reference # CED/TFL **4101** (Dr. M Kashif)

Dated: 25-10-2023

Reference of the request letter # 500kV/SS/N-LHR/BQB/159

Dated: 22-10-2023

Tension Test Report (Page -1/1)

Date of Test 27-10-2023

Gauge length 8 inches

Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size		Area (in ²)		Yield load (kg)	Breaking Load (kg)	Yield Stress (psi)		Ultimate Stress (psi)		Elongation (inch)	% Elongation	Remarks
		Nominal (#)	Actual (inch)	Nominal	Actual			Nominal	Actual	Nominal	Actual			
1	0.377	3	0.376	0.11	0.111	3400	5000	68200	67650	100200	99500	1.30	16.3	FF Steel
2	0.363	3	0.369	0.11	0.107	3400	4600	68200	70260	92200	95100	1.30	16.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and two samples for bend test														
Bend Test														
#3 Bar Bend Test Through 180° is Satisfactory														
#3 Bar Bend Test Through 180° is Satisfactory														

Witness by M Farhan (Senior Engr. Civil Barqaab)

I/C Testing Laboratoires
UET Lahore, Pakistan.

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,
Resident Engineer
NM Associates
DBD, Pine Hill Bridge-1, Islamabad

Reference # CED/TFL **4102** (Dr. M Kashif)
Reference of the request letter # Nil

Dated: 25-10-2023

Dated: 24-10-2023

Tension Test Report (Page -1/4)

Date of Test 27-10-2023
Gauge length 640 mm
Description Steel Strand Tensile Test as per ASTM A-416-94a

Sr. No.	Nominal Diameter	Nominal Weight	Measured weight	Yield strength clause (6.3)		Breaking strength clause (6.2)		Young's Modulus of Elasticity "E"	% Elongation	Remarks / Coil No.
	(mm)	(kg/km)	(kg/km)	(kg)	(kN)	(kg)	(kN)	GPa		
1	12.70 (1/2")	780.0	784.0	18100	177.56	19700	193.26	199	>3.50	xx
2	12.70 (1/2")	780.0	784.0	18100	177.56	19700	193.26	199	>3.50	xx
3	12.70 (1/2")	780.0	784.0	17700	173.64	19600	192.28	198	>3.50	xx
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
Only three samples for Test										

Note:

1. Modulus of Elasticity is based on nominal steel area of the steel strand vide clause 13.3 of ASTM – A416a
2. Load versus percentage strain graphs are attached

I/C Testing Laboratories
UET Lahore, Pakistan.

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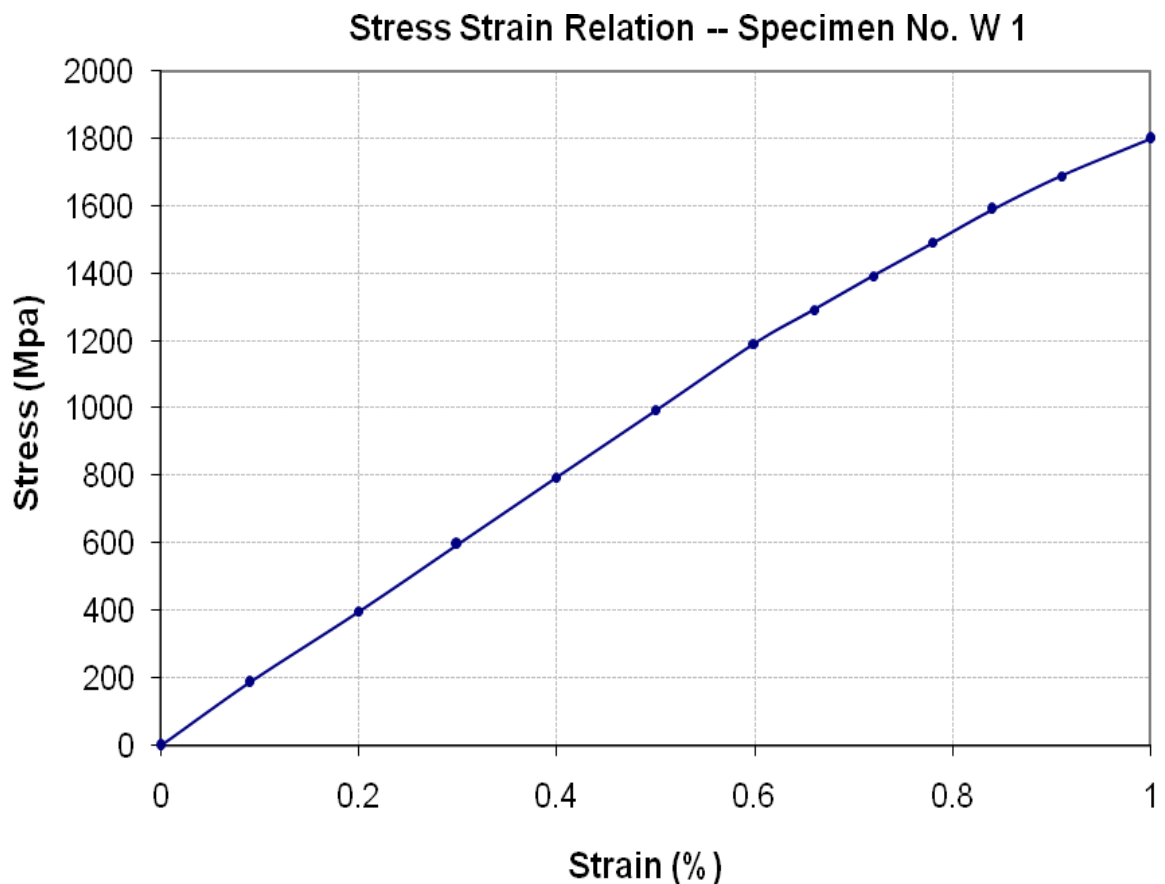
STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,
Resident Engineer
NM Associates
DBD, Pine Hill Bridge-1, Islamabad

Reference # CED/TFL 4102 (Dr. M Kashif)
Reference of the request letter # Nil

Dated: 25-10-2023
Dated: 24-10-2023

Graph (Page – 2/4)



I/C Testing Laboratoires
UET Lahore, Pakistan.

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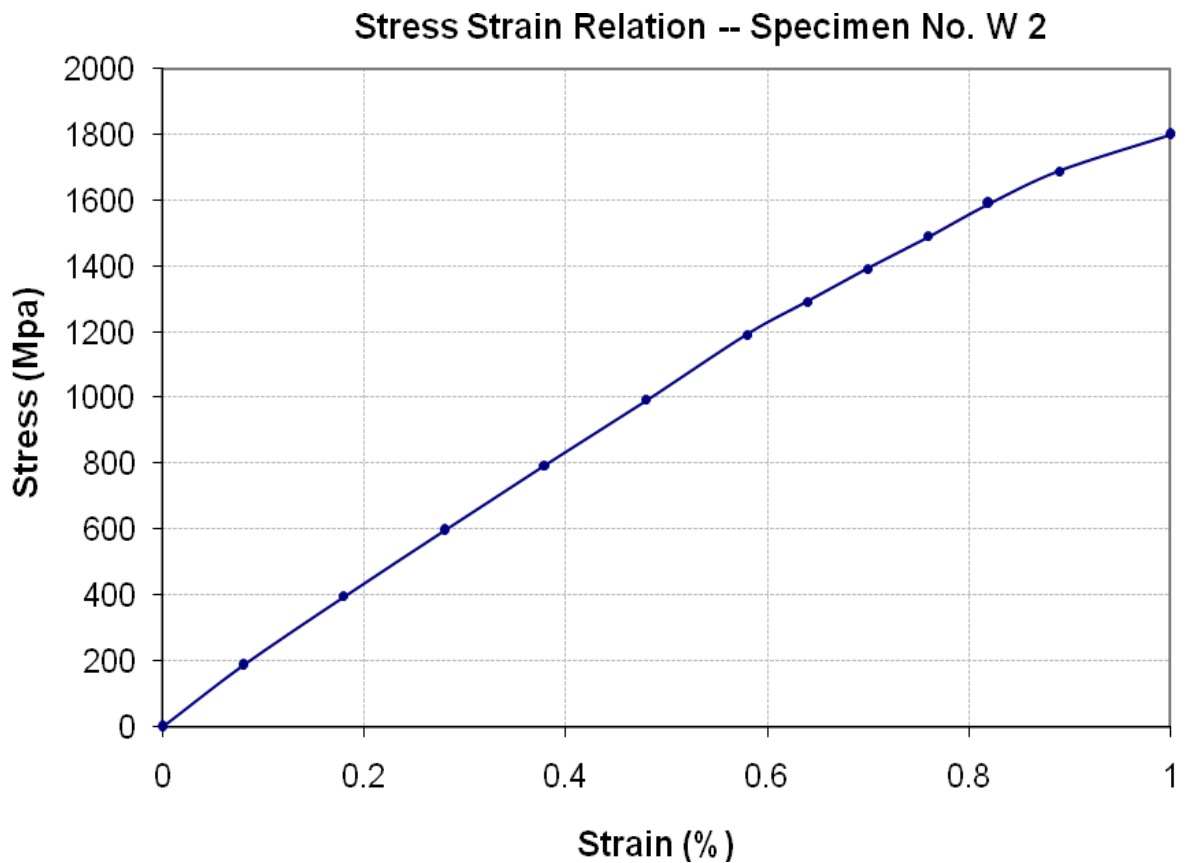
STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
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To,
Resident Engineer
NM Associates
DBD, Pine Hill Bridge-1, Islamabad

Reference # CED/TFL 4102 (Dr. M Kashif)
Reference of the request letter # Nil

Dated: 25-10-2023
Dated: 24-10-2023

Graph (Page – 3/4)



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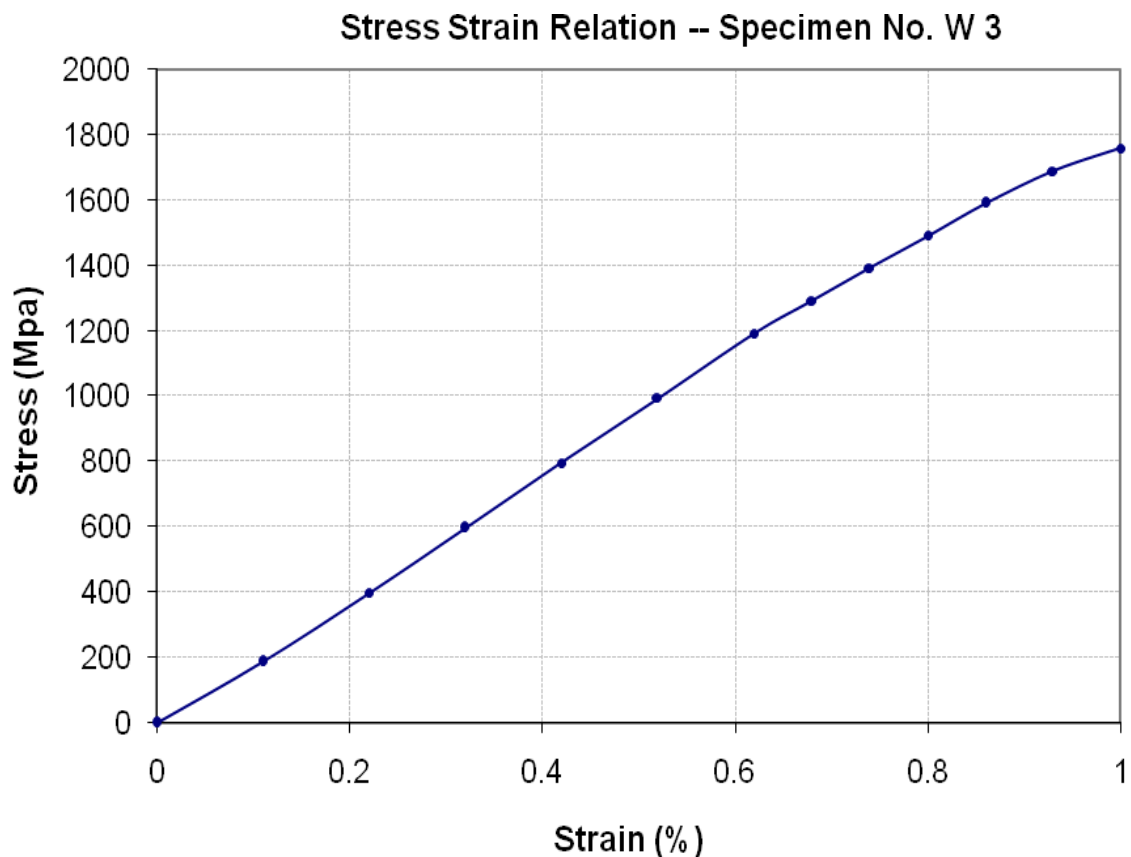
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Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,
Resident Engineer
NM Associates
DBD, Pine Hill Bridge-1, Islamabad

Reference # CED/TFL 4102 (Dr. M Kashif)
Reference of the request letter # Nil

Dated: 25-10-2023
Dated: 24-10-2023

Graph (Page – 4/4)



I/C Testing Laboratoires
UET Lahore, Pakistan.

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STRUCTURAL ENGINEERING DIVISION
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To,
Manager Commercial
Bakhtar Amin Memorial Trust
Construction of Building of Hospital + College Multan

Reference # CED/TFL **4103** (Dr. M Kashif)
Reference of the request letter # Nil

Dated: 25-10-2023
Dated: 25-10-2023

Tension Test Report (Page -1/1)

Date of Test 27-10-2023
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size		Area (in ²)		Yield load (kg)	Breaking Load (kg)	Yield Stress (psi)		Ultimate Stress (psi)		Elongation (inch)	% Elongation	Remarks
		Nominal (#)	Actual (inch)	Nominal	Actual			Nominal	Actual	Nominal	Actual			
1	0.363	3	0.368	0.11	0.107	3300	4600	66200	68230	92200	95200	1.40	17.5	Sheikhoo Steel
2	0.365	3	0.369	0.11	0.107	3200	4600	64200	65800	92200	94600	1.40	17.5	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180° is Satisfactory														

I/C Testing Laboratoires
UET Lahore, Pakistan.

Note:

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
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Pakistan. Ph: 92-42-99029202

To,

QA QC Manager
Zameen Development
Construction of Zameen Quadrangle at Plot # 49, Zafar Ali Road, Lahore

Reference # CED/TFL **4108** (Dr. M Kashif)

Dated: 26-10-2023

Reference of the request letter # ZD/QAQC/UQAD/04

Dated: 24-10-2023

Tension Test Report (Page -1/1)

Date of Test 27-10-2023

Gauge length 8 inches

Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size		Area (in ²)		Yield load (kg)	Breaking Load (kg)	Yield Stress (psi)		Ultimate Stress (psi)		Elongation (inch)	% Elongation	Remarks
		Nominal (#)	Actual (inch)	Nominal	Actual			Nominal	Actual	Nominal	Actual			
1	0.364	3	0.369	0.11	0.107	3600	4900	72200	74260	98200	101100	1.20	15.0	SJ Steel Heat # 106
2	0.370	3	0.372	0.11	0.109	3300	4900	66200	66930	98200	99400	1.30	16.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180° is Satisfactory														

Witness by Zulfiqar Ali (QC Inspector Zameen Group) & Ahsan Javed (Manager Corporate Sales SJ Steel)

I/C Testing Laboratoires
UET Lahore, Pakistan.

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STRUCTURAL ENGINEERING DIVISION
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Pakistan. Ph: 92-42-99029202

To,
 Project Manager
 United Lifestyle (Private) Limitd.
 High-Rise Building “Skyscrapers United” at Johar Town Lahore

Reference # CED/TFL **4109** (Dr. M Kashif)
 Reference of the request letter # ULS/2021-22-23/050

Dated: 26-10-2023
 Dated: 26-10-2023

Tension Test Report (Page -1/1)

Date of Test 27-10-2023
 Gauge length 8 inches
 Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size		Area (in ²)		Yield load (kg)	Breaking Load (kg)	Yield Stress (psi)		Ultimate Stress (psi)		Elongation (inch)	% Elongation	Remarks
		Nominal (#)	Actual (inch)	Nominal	Actual			Nominal	Actual	Nominal	Actual			
1	0.360	3	0.367	0.11	0.106	3200	4600	64200	66630	92200	95800	1.20	15.0	
2	0.392	3	0.383	0.11	0.115	3500	5000	70200	66920	100200	95600	1.40	17.5	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180° is Satisfactory														

I/C Testing Laboratoires
UET Lahore, Pakistan.

Note:

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
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Pakistan. Ph: 92-42-99029202

To,
Project Director
Rahim Yar Khan Industrial Estate
Rahim Yar Khan

Reference # CED/TFL 4111 (Dr. M Kashif)
Reference of the request letter # PIE/PD/RIE/2226

Dated: 26-10-2023
Dated: 25-10-2023

Tension Test Report (Page -1/1)

Date of Test 27-10-2023
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size		Area (in ²)		Yield load (kg)	Breaking Load (kg)	Yield Stress (psi)		Ultimate Stress (psi)		Elongation (inch)	% Elongation	Remarks
		Nominal (#)	Actual (inch)	Nominal	Actual			Nominal	Actual	Nominal	Actual			
1	0.403	3	0.388	0.11	0.118	3500	5100	70200	65120	102200	94900	1.50	18.8	
2	0.403	3	0.388	0.11	0.118	3600	5100	72200	67020	102200	95000	1.50	18.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180° is Satisfactory														

I/C Testing Laboratories
UET Lahore, Pakistan.

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,
M/S Premium Engineering
Lahore

Reference # CED/TFL **4113** (Dr. M Kashif)
Reference of the request letter # Nil

Dated: 26-10-2023
Dated: 26-10-2023

Tension Test Report (Page – 1/1)

Date of Test 27-10-2023
Gauge length 2 inches
Description Hot Rolled Steel Strip Tensile Test

Sr. No.	Designation	Size of Strip	X Section Area	Yield load	Breaking Load	Yield Stress	Ultimate Stress	Elongation	% Elongation	Remarks
	(mm)	(mm)	(mm ²)	(kg)	(kg)	(MPa)	(MPa)	(in)		
1	8	25.70x8.50	218.45	9600	11600	431	521	0.60	30.00	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
Only One Sample for Tensile Test										
Bend Test										

I/C Testing Laboratoires
UET Lahore, Pakistan.

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

Ref: CED/TFL/10/4115

Dated: 26-10-2023

Dated: 27-10-2023

To

M/A S.A.A. Engineering Works
Lahore

Subject: - CALIBRATION OF HYDRAULIC JACK (MARK: TFL/10/4115) (Page -1/1)

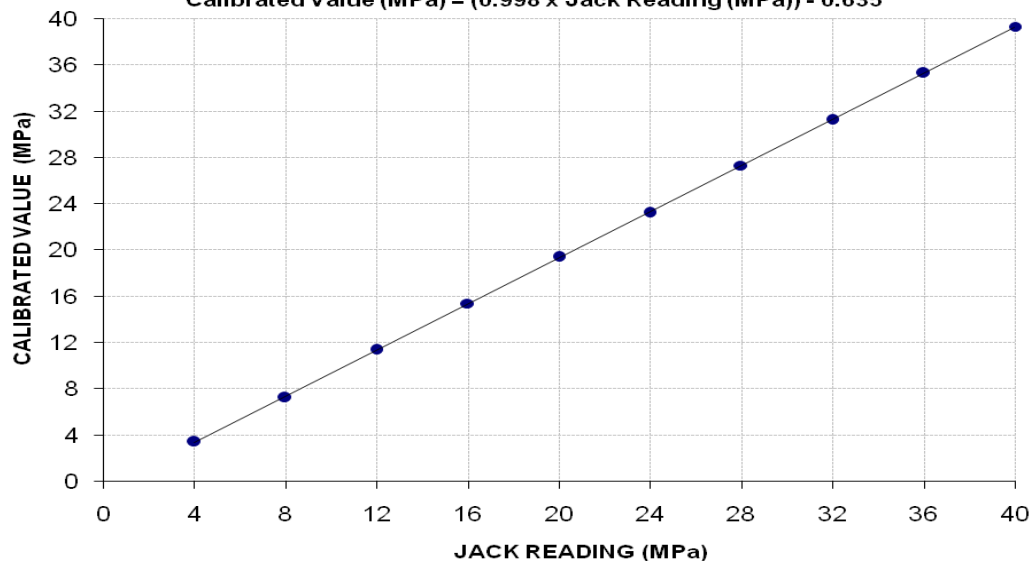
Reference to your Letter No. Nil, dated: 26/10/2023 on the subject cited above. One Hydraulic Jack (Jack No. Y.C.Q 250, Gauge No. KL 1.0) as received by us has been calibrated. The results are tabulated as under:

Total Range : Zero - 70 (MPa)
Calibrated Range : Zero - 32 (MPa)

Hydraulic Jack Reading (MPa)	4	8	12	16	20	24	28	32	36	40
Calibrated Load (kg)	16000	34000	53200	72000	90800	108800	128000	146400	165400	184200
Calibrated Pressure (Mpa)	3	7	11	15	19	23	27	31	35	39

The Ram Area of Jack = 459 cm²

Calibration Curve For Jack No. Y.C.Q 250 (Gauge # KL 1.0)
Calibrated Value (MPa) = (0.998 x Jack Reading (MPa)) - 0.635



I/C Testing Laboratoires
UET Lahore, Pakistan.

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,

QA/QC Manager
Power Construction Corporation of China Ltd
Tarbela 5th Extension Hydropower Project Management Department
(United Wire Industry Limited.)

Reference # CED/TFL **4117** (Dr. M Kashif)
Reference of the request letter # PCCCL/T5-QC-2023-009

Dated: 27-10-2023
Dated: 27-10-2023

Tension Test Report (Page – 1/3)

Date of Test 27-10-2023
Gauge length 640 mm
Description Steel Strand Tensile Test as per ASTM A-416-94a

Sr. No.	Nominal Diameter	Nominal Weight	Measured weight	Yield strength clause (6.3)		Breaking strength clause (6.2)		Young's Modulus of Elasticity	% Elongation	Remarks / Coil No.
	(mm)	(kg/km)	(kg/km)	(kg)	(kN)	(kg)	(kN)	E, GPa		
1	15.24 (0.6")	1102.0	1110.0	25000	245.25	27900	273.70	199	>3.50	1297
2	15.24 (0.6")	1102.0	1112.0	24600	241.33	27900	273.70	198	>3.50	1298
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
Only two samples for Test										

Note:

1. Modulus of Elasticity is based on nominal steel area of the steel strand vide clause 13.3 of ASTM – A416a
2. Load versus percentage strain graphs are attached

I/C Testing Laboratoires
UET Lahore, Pakistan.

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To,

QA/QC Manager
Power Construction Corporation of China Ltd
Tarbela 5th Extension Hydropower Project Management Department
(United Wire Industry Limited.)

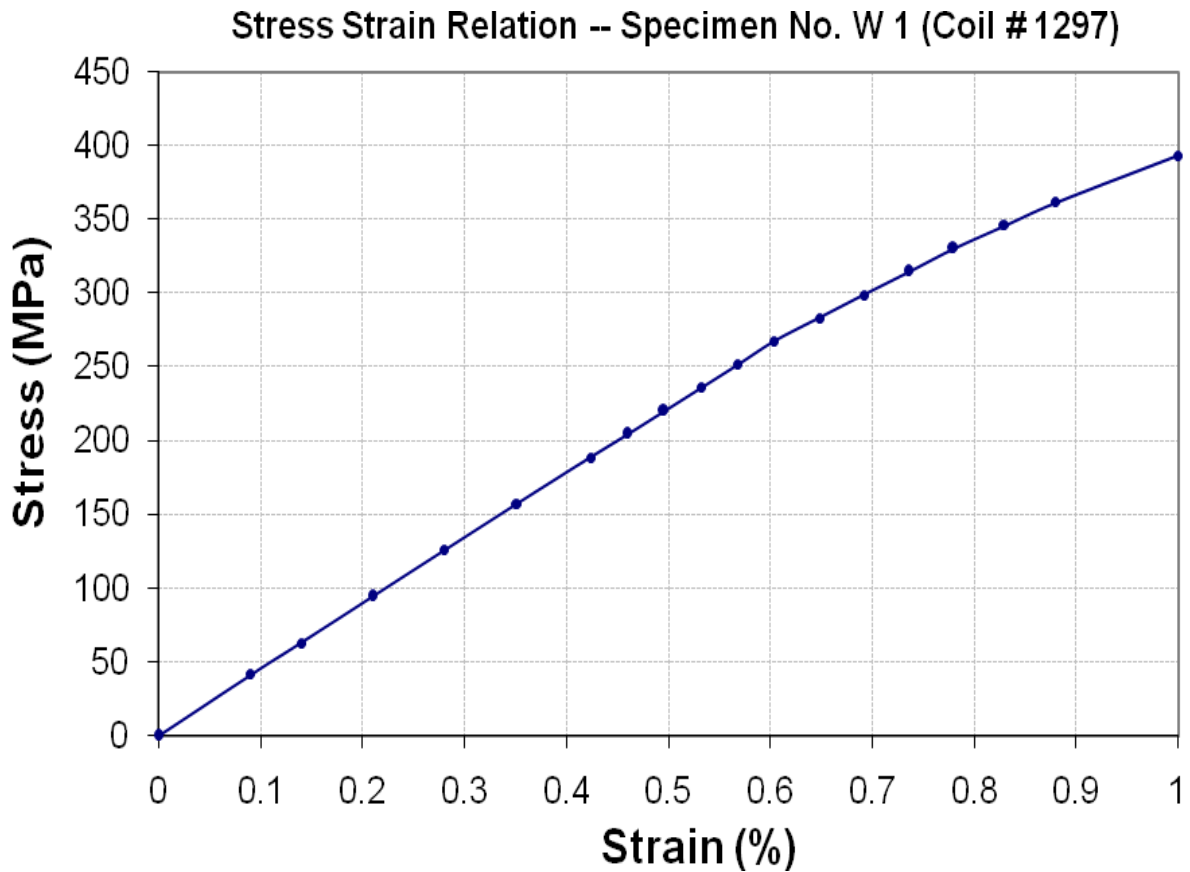
Reference # CED/TFL 4117 (Dr. M Kashif)

Dated: 27-10-2023

Reference of the request letter # PCCCL/T5-QC-2023-009

Dated: 27-10-2023

Graph (Page – 2/3)



I/C Testing Laboratories
UET Lahore, Pakistan.

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Test Floor Laboratory
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To,

QA/QC Manager
Power Construction Corporation of China Ltd
Tarbela 5th Extension Hydropower Project Management Department
(United Wire Industry Limited.)

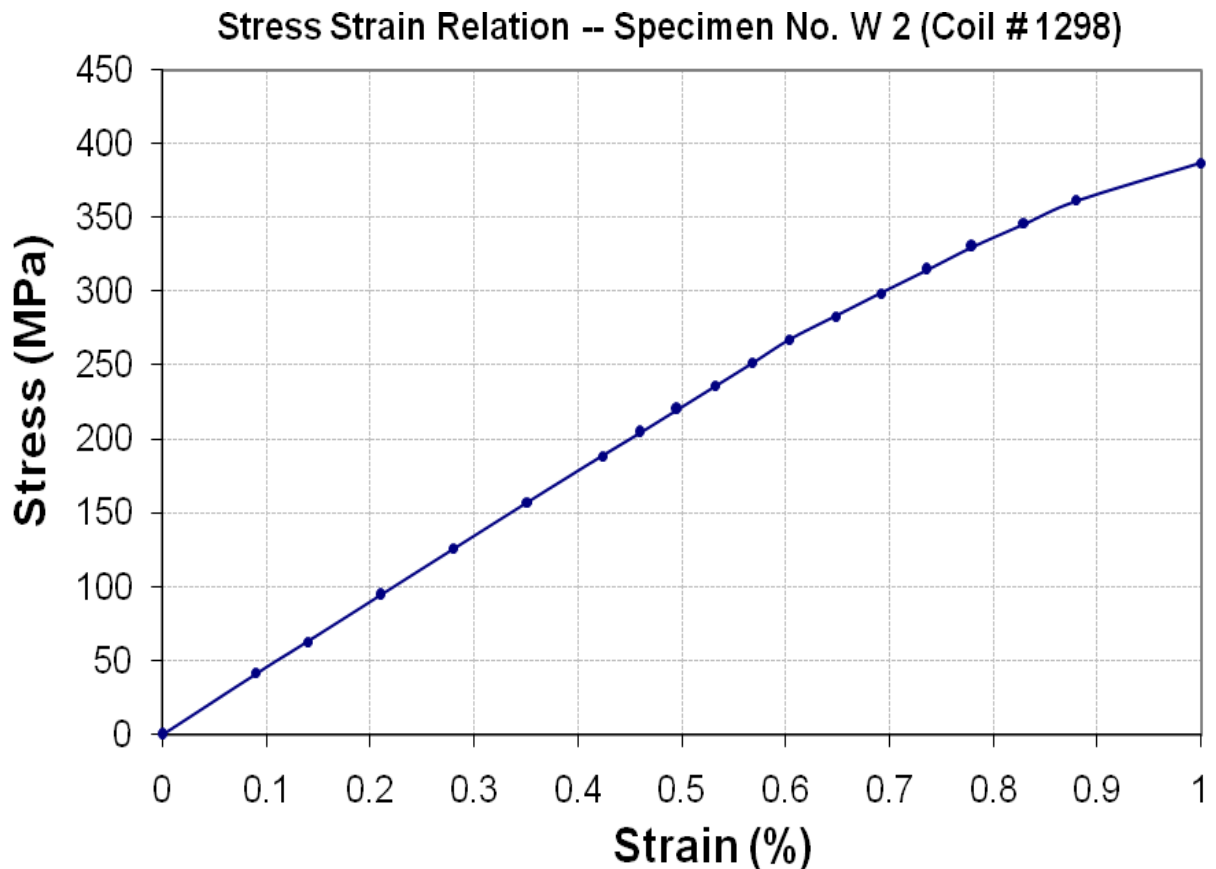
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Reference of the request letter # PCCCL/T5-QC-2023-009

Dated: 27-10-2023

Graph (Page – 3/3)



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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
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To,

Resident Engineer
NESPAK

Development of Signal Free Corridor from Main Boulevard Gulberg (Center Point) to
Walton Road (Defence Morr), Underpass at Khalid Butt Chowk, Lahore
(United Wires)

Reference # CED/TFL **4118** (Dr. M Kashif)

Dated: 27-10-2023

Reference of the request letter # 3772/103/KBC/SA/04/56

Dated: 26-10-2023

Tension Test Report (Page -1/2)

Date of Test 27-10-2023

Gauge length 640 mm

Description Steel Strand Tensile Test as per ASTM A-416-94a

Sr. No.	Nominal Diameter	Nominal Weight	Measured weight	Yield strength clause (6.3)		Breaking strength clause (6.2)		Young's Modulus of Elasticity "E"	% Elongation	Remarks / Coil No.
	(mm)	(kg/km)	(kg/km)	(kg)	(kN)	(kg)	(kN)	GPa		
1	12.70 (1/2")	780.0	783.0	17700	173.64	19700	193.26	198	>3.50	xx
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	
Only one sample for Test										

Note:

1. Modulus of Elasticity is based on nominal steel area of the steel strand vide clause 13.3 of ASTM – A416a
2. Load versus percentage strain graphs are attached

I/C Testing Laboratoires
UET Lahore, Pakistan.

Note:

- 1- You can See your reports On Internet in the following web site
http://www.uet.edu.pk/faculties/facultiesinfo/civil/index.html?RID=testing_reports
2. The above results pertain to sample /samples supplied to this laboratory.
- 3- Sealed sample / Unsealed sample / Marked sample/Signed Samples



STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,

Resident Engineer
NESPAK

Development of Signal Free Corridor from Main Boulevard Gulberg (Center Point) to
Walton Road (Defence Morr), Underpass at Khalid Butt Chowk, Lahore
(United Wires)

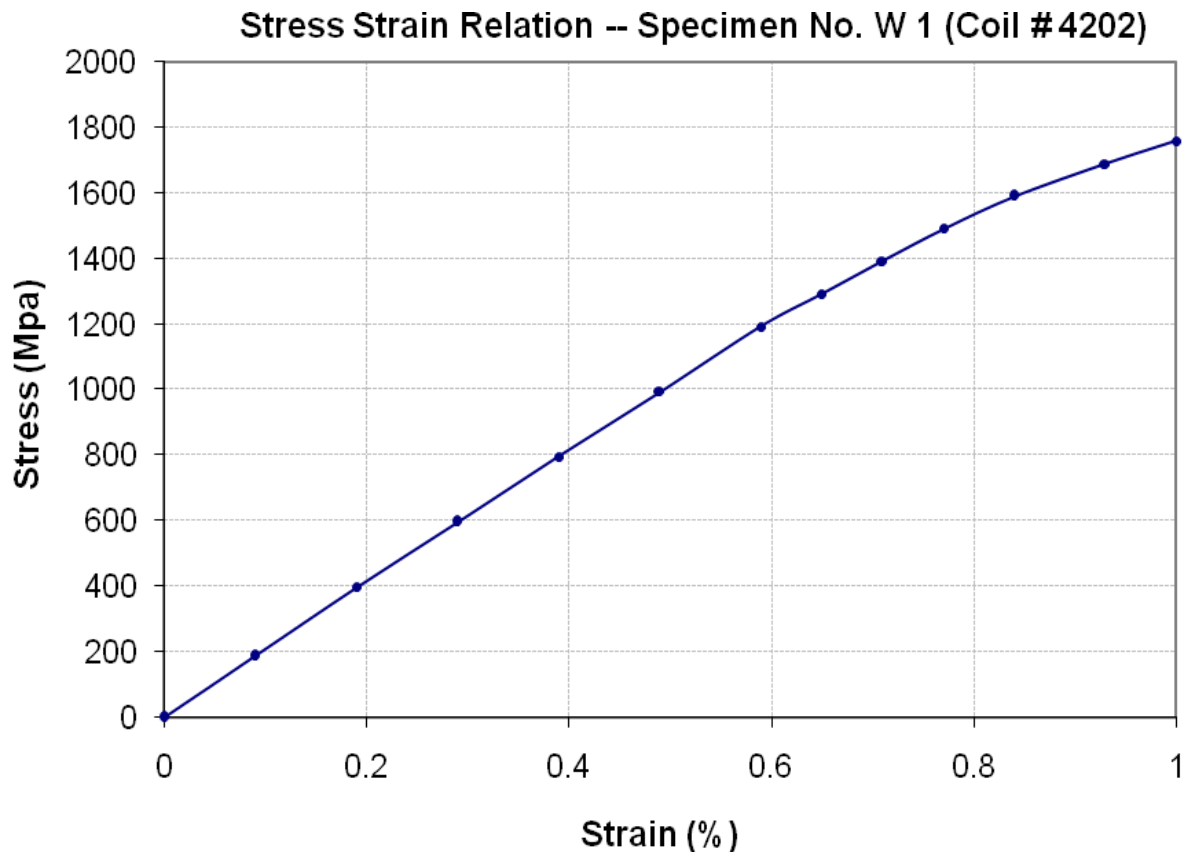
Reference # CED/TFL **4118** (Dr. M Kashif)

Dated: 27-10-2023

Reference of the request letter # 3772/103/KBC/SA/04/56

Dated: 26-10-2023

Graph (Page – 2/2)



I/C Testing Laboratories
UET Lahore, Pakistan.

Note:

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- 2- The above results pertain to sample /samples supplied to this laboratory.
- 3- Sealed sample / Unsealed sample / Marked sample/Signed Samples



STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,
 M/S Unicef
 Islambad
 (Construction of EPI Warehouse at Manga Mandi, Lahore.)

Reference # CED/TFL **4119** (Dr. M Rizwan Riaz)
 Reference of the request letter # Nil

Dated: 27-10-2023
 Dated: 27-10-2023

Tension Test Report (Page -1/1)

Date of Test 30-10-2023
 Gauge length 8 inches
 Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size		Area (in ²)		Yield load (kg)	Breaking Load (kg)	Yield Stress (psi)		Ultimate Stress (psi)		Elongation (inch)	% Elongation	Remarks
		Nominal (#)	Actual (inch)	Nominal	Actual			Nominal	Actual	Nominal	Actual			
1	0.366	3	0.370	0.11	0.108	3600	4800	72200	73680	96200	98300	1.20	15.0	FF Steel
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only one sample for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180° is Satisfactory														

I/C Testing Laboratoires
UET Lahore, Pakistan.

Note:

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2. The above results pertain to sample /samples supplied to this laboratory.
- 3- Sealed sample / Unsealed sample / Marked sample/Signed Samples



STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,

Project Manager
High-Q Constructions
Construction of High-Q Mall at 3-A, Gulberg II, Lahore.

Reference # CED/TFL **4123** (Dr. M Kashif)
Reference of the request letter # QC/HQ/CIVIL/149

Dated: 27-10-2023
Dated: 27-10-2023

Tension Test Report (Page -1/1)

Date of Test 27-10-2023
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size (mm)		Area (in ²)		Yield load (kg)	Breaking Load (kg)	Yield Stress (psi)		Ultimate Stress (psi)		Elongation (inch)	% Elongation	Remarks
		Nominal	Actual	Nominal	Actual			Nominal	Actual	Nominal	Actual			
1	4.185	32	31.79	1.25	1.230	38800	57600	68431	69530	101588	103300	1.30	16.3	
2	4.292	32	32.19	1.25	1.262	40600	59600	71605	70930	105115	104200	1.20	15.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
32mm Dia Bar Bend Test Through 180° is Satisfactory														

I/C Testing Laboratories
UET Lahore, Pakistan.

Note:

- 1- You can See your reports On Internet in the following web site
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- 2- The above results pertain to sample /samples supplied to this laboratory.
- 3- Sealed sample / Unsealed sample / Marked sample/Signed Samples