



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/12/2442

Dated: 13-12-2022

Dated of Test: 16-12-2022

To

Assistant Project Director
PMU-SBP (Faisalabad)
Tehsil Sports Complex Bhawana, District Chiniot. (GS # 644)

Subject: **TESTING OF R.C.C. PIPE [ASTM-C76 - 08a] (Page -1/2)**

Reference to your letter No. APD/PMU/SBP/TEST/420, dated 06.10.2022

on the subject cited above. One R.C.C. Pipe as received by us have 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	9	7.76	7.32	10.87	8.47	1.20	3700	5800	1577	2472

I/C Testing Laboratoires
UET Lahore, Pakistan.

Note:

- 1- You can See your reports On Internet in the following web site
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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/12/2442

Dated: 13-12-2022

Dated of Test: 16-12-2022

To

Assistant Project Director
PMU-SBP (Faisalabad)
Construction of Tehsil Sports Complex Dijkot, Faisalabad. (GS # 635)

Subject: **TESTING OF R.C.C. PIPE [ASTM-C76 - 08a] (Page -2/2)**

Reference to your letter No. APD/PMU/SBP/TEST/462, dated 18.11.2022

on the subject cited above. One R.C.C. Pipe as received by us have 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	9	7.81	7.32	10.94	8.63	1.16	3500	6500	1465	2720

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,

Resident Engineer (RRWP-II)
PEAS Consulting (Pvt) Ltd
Rawat – Rawalpindi Widening Project (RRWP) – Phase – II
Conserof 2-Lane Lai and Swan Bridges to 04-Lane Bridges

Reference # CED/TFL **2445** (Dr. M Kashif)
Reference of the request letter # PEAS/NHA/RE/2022/330

Dated: 14-12-2022

Dated: 13-12-2022

Tension Test Report (Page -1/4)

Date of Test 16-12-2022
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")	775.0	781.0	17700	173.64	19300	189.33	199	>3.50	xx
2	12.70 (1/2")	775.0	781.0	17100	167.75	19400	190.31	198	>3.50	xx
3	12.70 (1/2")	775.0	781.0	17500	171.68	19400	190.31	199	>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 Laboratoires
UET Lahore, Pakistan.

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STRUCTURAL ENGINEERING DIVISION
Test Floor Laboratory
Department of Civil Engineering
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Pakistan. Ph: 92-42-99029202

To,

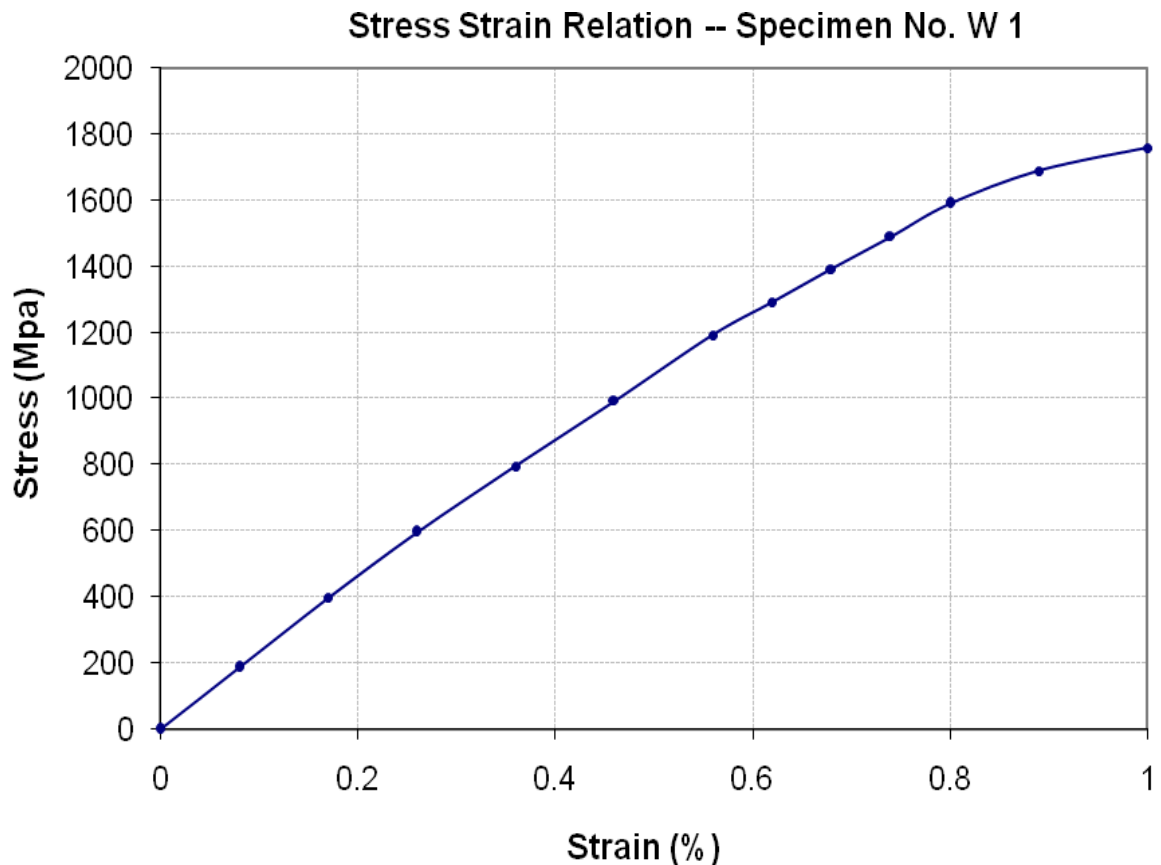
Resident Engineer (RRWP-II)
PEAS Consulting (Pvt) Ltd
Rawat – Rawalpindi Widening Project (RRWP) – Phase – II
Conserof 2-Lane Lai and Swan Bridges to 04-Lane Bridges

Reference # CED/TFL **2445** (Dr. M Kashif)
Reference of the request letter # PEAS/NHA/RE/2022/330

Dated: 14-12-2022

Dated: 13-12-2022

Graph (Page – 2/4)



I/C Testing Laboratoires
UET Lahore, Pakistan.

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Test Floor Laboratory
Department of Civil Engineering
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To,

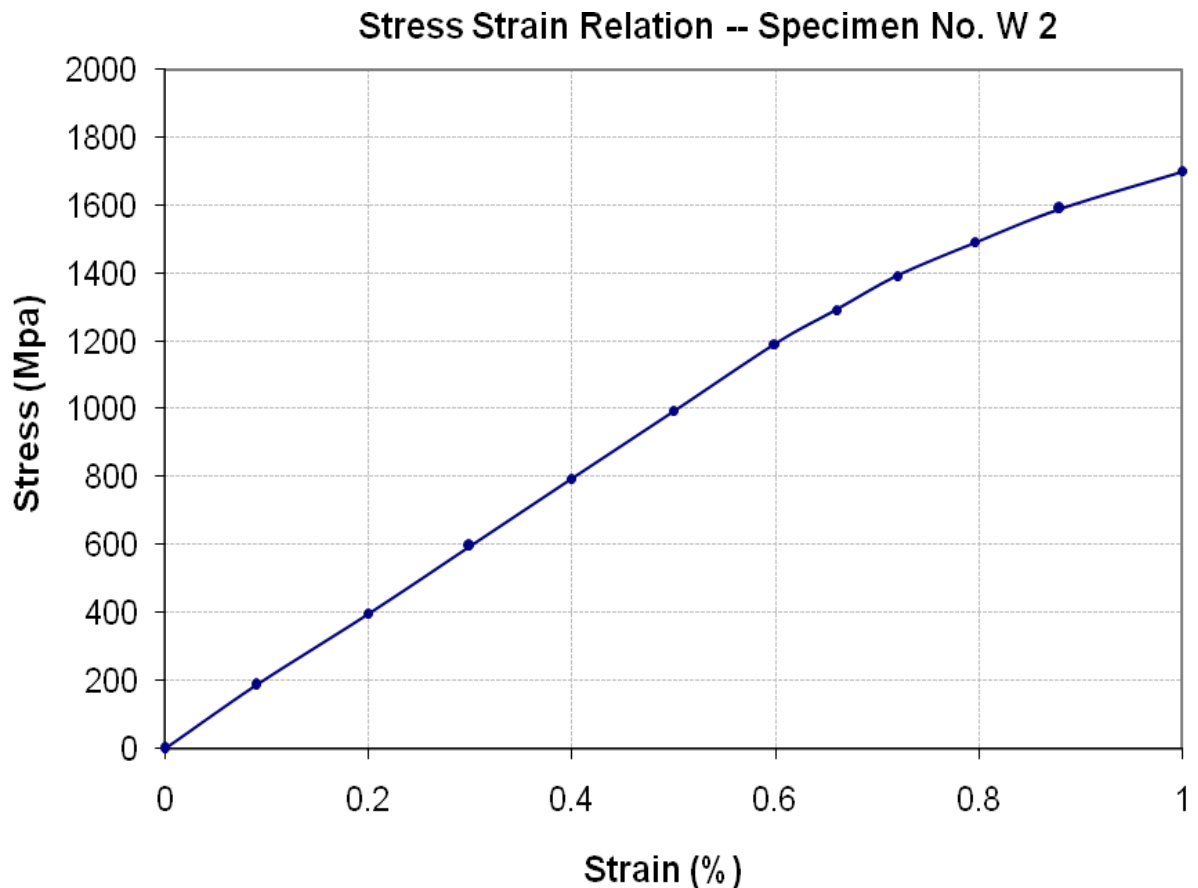
Resident Engineer (RRWP-II)
PEAS Consulting (Pvt) Ltd
Rawat – Rawalpindi Widening Project (RRWP) – Phase – II
Conserof 2-Lane Lai and Swan Bridges to 04-Lane Bridges

Reference # CED/TFL **2445** (Dr. M Kashif)
Reference of the request letter # PEAS/NHA/RE/2022/330

Dated: 14-12-2022

Dated: 13-12-2022

Graph (Page – 3/4)



I/C Testing Laboratoires
UET Lahore, Pakistan.

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Department of Civil Engineering
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To,

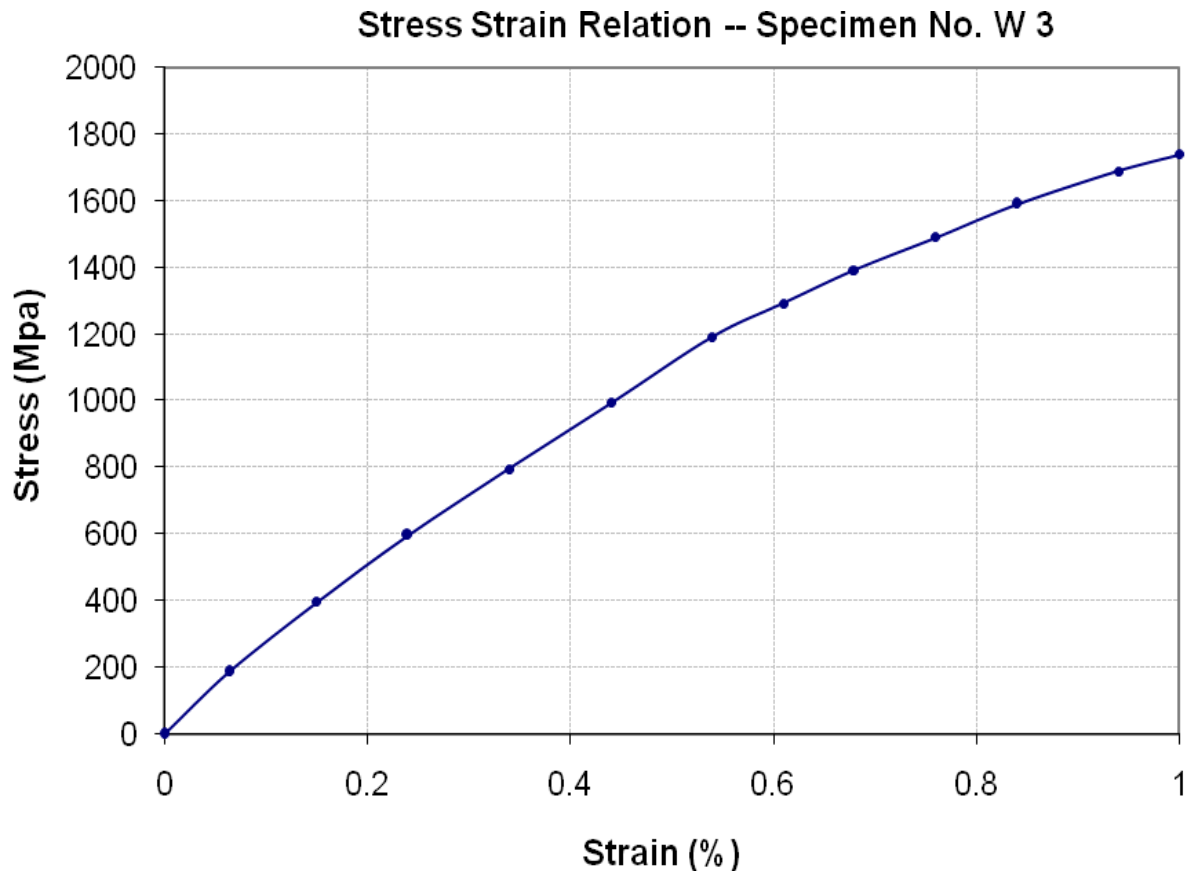
Resident Engineer (RRWP-II)
PEAS Consulting (Pvt) Ltd
Rawat – Rawalpindi Widening Project (RRWP) – Phase – II
Conversion of 2-Lane Lai and Swan Bridges to 04-Lane Bridges

Reference # CED/TFL **2445** (Dr. M Kashif)
Reference of the request letter # PEAS/NHA/RE/2022/330

Dated: 14-12-2022

Dated: 13-12-2022

Graph (Page – 4/4)



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,
 Material Engineer
 Banu Mukhtar Contracting (Pvt) Ltd.
 Masjid Ibrahim, Gajju Matta

Reference # CED/TFL **2446** (Dr. M Kashif)
 Reference of the request letter # BMC/MAIB/002

Dated: 14-12-2022
 Dated: 14-12-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
 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	4000	5200	80200	79540	104200	103400	0.90	11.3	
2	0.378	3	0.376	0.11	0.111	3900	5100	78200	77450	102200	101300	1.00	12.5	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

Ref: CED/TFL/12/2447

Dated: 14-12-2022

Dated of Test: 16-12-2022

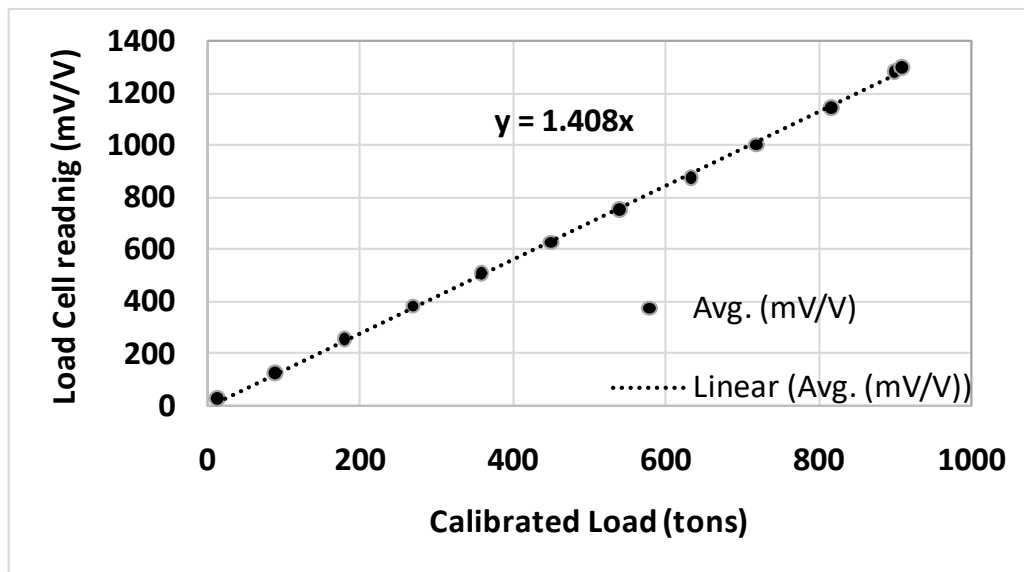
To

Project Manager
CCECC-SALMAN Jv
Establishment of University of Applied Engineering and Emerging
Technology
(UAEET), Sambrial

Subject: - CALIBRATION OF LOAD CELL (Page -1/1)

Reference to your Letter No. CCECC&S-JV/UAEET/SAMBRIAL/L-186,
Dated: 08/08/2022 on the subject cited above. One Load Cell(Load Cell Make: W.T.S.,
UK, Sr. No. W14502, Load Cell Model No. W14502 Rated Capacity 1500 Tons) against
Ref. load cell no. 3766 make Huggenberger. The results are tabulated as under:

Calibrated Load (tons)	13	90	180	270	360	450.9	540	634.3	720.2	818	900	910.7
Load Cell readnig (mV/V)	31.2	131.2	257.2	385	511.8	628.4	752.7	878.25	1002.2	1146.7	1280.75	1299.95



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,
 Senior Project Manager
 Shifa Development Services Pvt Ltd
 Under Construction Site of Shifa National Hospital
 Opposite Al-Qadir Garden, Lahore Sheikhupura Road, Faisalabad

Reference # CED/TFL **2448** (Dr. M Kashif)
 Reference of the request letter # SNHF/SDS/ST/13

Dated: 14-12-2022
 Dated: 14-12-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
 Gauge length 8 inches
 Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size (inch)		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	0.379	3/8	0.377	0.11	0.111	3800	5100	76200	75190	102200	101000	1.10	13.8	Pak Iron
2	0.372	3/8	0.373	0.11	0.109	3800	5200	76200	76580	104200	104800	0.90	11.3	
3	0.379	3/8	0.377	0.11	0.111	3900	5000	78200	77100	100200	98900	1.10	13.8	
4	0.375	3/8	0.375	0.11	0.110	3700	4800	74200	73940	96200	96000	0.90	11.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only four samples for tensile and two samples for bend test														
Bend Test														
3/8" Dia Bar Bend Test Through 180° is Satisfactory														
3/8" Dia Bar Bend Test Through 180° is Satisfactory														

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,

Sr. Manager Projects
Izhar Construction (Pvt) Ltd
Construction of Riphah Medical City Gulberg Greens Islamabad (Retaining Piles)

Reference # CED/TFL **2449** (Dr. M Kashif)

Dated: 14-12-2022

Reference of the request letter # IZHAR/RIPHAH/021/2022

Dated: 12-12-2022

Tension Test Report (Page – 1/1)

Date of Test 16-12-2022

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)		% Elongation	Remarks / Coil No.
	(mm)	(kg/km)	(kg/km)	(kg)	(kN)	(kg)	(kN)		
1	12.70 (1/2")	775.0	781.0	17800	174.62	19500	191.30	>3.50	xx
2	12.70 (1/2")	775.0	782.0	18000	176.58	19400	190.31	>3.50	xx
3	12.70 (1/2")	775.0	785.0	17900	175.60	19500	191.30	>3.50	xx
-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	

Only three samples for 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/12/2451

Dated: 14-12-2022

Dated of Test: 16-12-2022

To

Assistant Director (QCD)
WASA, LDA, Lahore
(M/s Busmillah RCC Pipe Factory)

Subject: - CALIBRATION OF HYDRAULIC JACK WITH GAUGE
(MARK: TFL/12/2451)

Reference to your Letter No. QCD/2338-39, Dated: 28/11/2022 on the subject cited above. One Hydraulic Jack with Gauge as received by us has been calibrated. The results are tabulated as under:

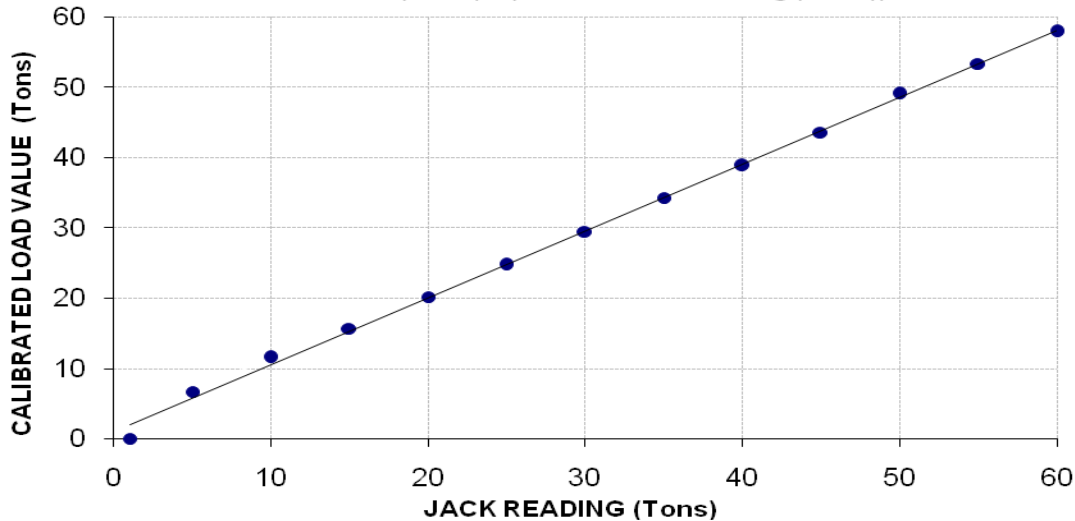
Total Range : Zero - 76 (Ton)
Calibrated Range : Zero - 60 (Ton)

Hydraulic Jack Reading (Ton)	1	5	10	15	20	25	30	35	40	45	50	55	60
Calibrated Load (kg)	0	6067	10467	14200	18333	22467	26767	31133	35267	39567	44533	48467	52600
Calibrated Load (Ton)	0	6.68	11.52	15.64	20.19	24.74	29.47	34.28	38.83	43.57	49.04	53.37	57.92

1000 kg = 1.1011 Ton

Calibration Curve For Jack

Calibrated Value (Tons) = (0.952 x Jack Reading (Tons)) + 0.98



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 Rupafil Limited
Lahore

Reference # CED/TFL **2453** (Dr. M Kashif)
Reference of the request letter # Nil

Dated: 15-12-2022
Dated: 14-12-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size (inch)		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	0.413	3/8	0.393	0.11	0.121	4300	5200	86200	78060	104200	94400	1.40	17.5	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only one sample for tensile and one sample for bend test														
Bend Test														
3/8" Dia Bar Bend Test Through 180° is Satisfactory														

I/C Testing Laboratories
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,

Manager Civil
 Nishat Mills Limited
 Dyeing & Finishing Plant, Lahore
 “Construction of Fabric Godown Extension Unit 35” Lahore

Reference # CED/TFL **2454** (Dr. M Kashif)
 Reference of the request letter # NDF/FGST/002

Dated: 15-12-2022
 Dated: 13-12-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
 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	0.406	10	9.91	0.12	0.119	4000	5600	73487	73810	102881	103400	1.30	16.3	Kamran Steel
2	0.403	10	9.87	0.12	0.119	4000	5400	73487	74340	99207	100400	1.30	16.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
10mm Dia 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
Department of Civil Engineering
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Pakistan. Ph: 92-42-99029202

To,

XEN
 GE (Air) Lahore
 Rehabilitation of 101 Building (Phase-X) at PAF Base Lahore

Reference # CED/TFL **2456** (Dr. M Kashif)
 Reference of the request letter # 6744/14/E-6

Dated: 15-12-2022
 Dated: 17-11-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
 Gauge length 8 inches
 Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight (lbs/ft)	Diameter/ Size (inch)		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	0.373	3/8	0.374	0.11	0.110	3200	5200	64200	64260	104200	104500	1.30	16.3	
2	0.361	3/8	0.367	0.11	0.106	3200	5200	64200	66530	104200	108100	1.20	15.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
3/8" Dia 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
Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,

Resident Engineer
 NESPAK
 Dualization of Sargodha Khushab Mianwali Road (Group-IV from km 244.81 to 267.37
 = 22.56km)

Reference # CED/TFL **2457** (Dr. M Kashif)
 Reference of the request letter # RE/4376-E/MH/4d/176

Dated: 15-12-2022
 Dated: 08-12-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
 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	4400	68200	67590	88200	87500	1.40	17.5	Supreme
2	0.378	3	0.376	0.11	0.111	3500	4400	70200	69490	88200	87400	1.70	21.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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:

- 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,
 Assistant Director
 Defence Housing Authority
 Gujranwala
 "Sector G"

Reference # CED/TFL **2458** (Dr. M Kashif)
 Reference of the request letter # 111/15/AD/RS/Pkg-2B/1063

Dated: 15-12-2022
 Dated: 14-12-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
 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	0.370	3	0.372	0.11	0.109	3800	4500	76200	76970	90200	91200	1.20	15.0	Union Steel
2	0.371	3	0.373	0.11	0.109	3800	4600	76200	76730	92200	92900	1.10	13.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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 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,
 Resident Engineer,
 Orbit Housing
 The Spring Apartment Homes

Reference # CED/TFL 2459 (Dr. Asad Ali)
 Reference of the request letter# NIL

Dated: 16-12-2022
 Dated: 16-12-2022

Tension Test Report (Page -1/1)

Date of Test 16-12-2022
 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	0.375	3	0.374	0.11	0.110	3440	4810	69000	68870	96400	96300	1.20	15.0	
2	0.371	3	0.373	0.11	0.109	3420	4810	68600	69060	96400	97200	1.20	15.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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.

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