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
Pakistan Engineering Council (PEC)
Additional Block Building, Sector G-5/2, Islamabad

Reference # CED/TFL **6090** (Dr. M Kashif) Dated: 03-12-2024
Reference of the request letter # 4125/321/AA/MISC/025 Dated: 03-12-2024

Tension Test Report (Page – 1/2)

Date of Test 09-12-2024
Gauge length 2 inches
Description M.S Seamless Pipe Steel Strip Tensile Test

Sr. No.	Designation		Size of Strip	X Section Area	Yield load	Breaking Load	Yield Stress	Ultimate Stress	Elongation	% Elongation	Remarks
	(inch)		(mm)	(mm^2)	(kg)	(kg)	(MPa)	(MPa)	(in)		
1	**M.S Seamless Pipe**	**1**	**29.50x3.38**	**99.71**	**4200**	**5280**	**413**	**519**	**0.50**	**25.00**	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-			-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-			-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-			-	-	-	-	-	-	-	-	
Only Two Samples for Tensile Test											
Bend Test											

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To,

Resident Engineer
NESPAK
Pakistan Engineering Council (PEC)
Additional Block Building, Sector G-5/2, Islamabad

Reference # CED/TFL **6090** (Dr. M Kashif) Dated: 03-12-2024
Reference of the request letter # 4125/321/AA/MISC/025 Dated: 03-12-2024

Weight &Size Test Report (Page – 4/4)

Date of Test 09-12-2024
Description M.S Seamless Pipe Weight and Size Test

Sr. No.	Designation	Wall Thickness	Remark
	(inch)	(mm)	
1	**1**	**3.38**	
2	**1-1/2**	**3.68**	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
Only Two Samples for Test			

To

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Project Manager
Cattle Market, Jhang
Engineering Consultancy Services Punjab (Pvt) Ltd.
Construction of Model Cattle Market, Jhang.

Reference # CED/TFL **6107** (Dr. M Kashif) Dated: 06-12-2024
Reference of the request letter # JHANG/FWO/2024/003 Dated: 03-12-2024

Tension Test Report (Page -1/1)

Date of Test 09-11-2024
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight	Diameter/ Size		Area (in^2)		Yield load	Breaking Load	Yield Stress (psi)		Ultimate Stress (psi)		Elongation	% Elongation	Remarks
	(lbs/ft)	Nominal (#)	Actual (inch)	Nominal	Actual	(kg)	(kg)	Nominal	Actual	Nominal	Actual	(inch)		
1	0.378	3	0.376	0.11	0.111	3300	5100	66200	65420	102200	101100	1.40	17.5	AF Steel
2	0.379	3	0.377	0.11	0.112	3200	4900	64200	63250	98200	96900	1.30	16.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180º is Satisfactory														

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

To

Resident Engineer
Engineering Consultancy Services Punjab (Pvt) Ltd.
Model Cattle Market Shahpur Kanjra, Lahore.

Reference # CED/TFL **6110** (Dr. M Kashif) Dated: 06-12-2024
Reference of the request letter # ECSP/MCML/09 Dated: 03-12-2024

Tension Test Report (Page -1/1)

Date of Test 09-11-2024
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight	Diameter/ Size		Area (in^2)		Yield load	Breaking Load	Yield Stress (psi)		Ultimate Stress (psi)		Elongation	% Elongation	Remarks
	(lbs/ft)	Nominal (#)	Actual (inch)	Nominal	Actual	(kg)	(kg)	Nominal	Actual	Nominal	Actual	(inch)		
1	0.376	3	0.375	0.11	0.111	3300	4600	66200	65820	92200	91800	0.80	10.0	AF Steel
2	0.376	3	0.375	0.11	0.111	3200	4600	64200	63750	92200	91700	0.80	10.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Note: only two samples for tensile and one sample for bend test

Bend Test

#3 Bar Bend Test Through 180º is Satisfactory

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University of Engineering and Technology Lahore, 54890
Pakistan. Ph: 92-42-99029202

To,

General Manager
Jafris and Steele (Private) Limited.
Construction of Al-Munawar Residential.

Reference # CED/TFL **6111** (Dr. M Kashif) Dated: 06-12-2024
Reference of the request letter # js80/526 Dated: 04-12-2024

Tension Test Report (Page -1/1)

Date of Test 09-12-2024
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight	Diameter/ Size (mm)		Area (in^2)		Yield load	Breaking Load	Yield Stress (psi)		Ultimate Stress (psi)		Elongation	% Elongation	Remarks
	(lbs/ft)	Nominal	Actual	Nominal	Actual	(kg)	(kg)	Nominal	Actual	Nominal	Actual	(inch)		
1	4.182	32	31.78	1.25	1.229	35000	51000	61729	62750	89948	91500	1.50	18.8	
2	4.159	32	31.69	1.25	1.222	38400	52600	67725	69240	92770	94900	1.30	16.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
32mm Bar Bend Test Through 180º is Satisfactory														

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Pakistan. Ph: 92-42-99029202

To,

Asst Dir Lab
Defence Housing Authority
Bahawalpur

Reference # CED/TFL **6112** (Dr. M Kashif) Dated: 06-12-2024
Reference of the request letter # 530/QC/MTL Dated: 05-12-2024

Tension Test Report (Page -1/1)

Date of Test 09-12-2024
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight	Diameter/ Size		Area (in^2)		Yield load	Breaking Load	Yield Stress (psi)		Ultimate Stress (psi)		Elongation	% Elongation	Remarks
	(lbs/ft)	Nominal (#)	Actual (inch)	Nominal	Actual	(kg)	(kg)	Nominal	Actual	Nominal	Actual	(inch)		
1	0.361	3	0.367	0.11	0.106	3200	4800	64200	66550	96200	99900	1.40	17.5	Hunza Steel
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Note: only one sample for tensile and one sample for bend test

Bend Test

#3 Bar Bend Test Through 180º is Satisfactory

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

To,

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

Reference # CED/TFL **6113** (Dr. M Kashif) Dated: 06-12-2024
Reference of the request letter # QCD/2439 Dated: 04-12-2024

Tension Test Report (Page -1/1)

Date of Test 09-12-2024
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight	Diameter/ Size		Area (in^2)		Yield load	Breaking Load	Yield Stress (psi)		Ultimate Stress (psi)		Elongation	% Elongation	Remarks
	(lbs/ft)	Nominal (#)	Actual (inch)	Nominal	Actual	(kg)	(kg)	Nominal	Actual	Nominal	Actual	(inch)		
1	0.399	3	0.386	0.11	0.117	3700	5500	74200	69560	110200	103400	1.20	15.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only one sample for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180º is Satisfactory														

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

To,

Resident Engineer
NESPAK – TurkPak Jv
Establishment of 200 Bedded Mother and Child Hospital Nursing College at District Bahawalnagar.

Reference # CED/TFL **6116** (Dr. M Kashif) Dated: 09-12-2024
Reference of the request letter # 4460/13/MA/04/431 Dated: 04-12-2024

Tension Test Report (Page -1/1)

Date of Test 09-12-2024
Gauge length 8 inches
Description Deformed Steel Bar Tensile and Bend Test as per ASTM-A615

Sr. No.	Weight	Diameter/ Size		Area (in^2)		Yield load	Breaking Load	Yield Stress (psi)		Ultimate Stress (psi)		Elongation	% Elongation	Remarks
	(lbs/ft)	Nominal (#)	Actual (inch)	Nominal	Actual	(kg)	(kg)	Nominal	Actual	Nominal	Actual	(inch)		
1	0.377	3	0.376	0.11	0.111	3200	5100	64200	63620	102200	101400	1.10	13.8	SGI Steel
2	0.378	3	0.376	0.11	0.111	3200	5000	64200	63460	100200	99200	1.00	12.5	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one sample for bend test														
Bend Test														
#3 Bar Bend Test Through 180º is Satisfactory														

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

To,

M/S Heaven's Way Zipline Adventure (Pvt) Ltd.
Islamabad
(Sherwn Adventure Family Park, Abbottabad.)

Reference # CED/TFL **6117** (Dr. M Kashif) Dated: 09-12-2024
Reference of the request letter # 6/12/2024/158 Dated: 06-12-2024

Tension Test Report (Page – 1/1)

Date of Test 09-12-2024
Description Galvanized Steel Core Wire (Rope) Tensile Test

Sr. No.	Nominal Diameter	Measured weight	Breaking Load		Remarks / Coil No.
	(mm)	(kg/m)	(kg)	(kN)	
1	**14**	**0.73**	**10200**	**100.06**	
-	-	-	-		
-	-	-	-		
-	-	-	-		
-	-	-	-		
Only one sample for Test					

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Department of Civil Engineering
University of Engineering and Technology Lahore, 54890
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Three-Edge Bearing Test Report

DEPARTMENT OF CIVIL ENGINEERING, UET, LAHORE

Report Prepared for
Assistant Resident Engineer

PKG-03 Kamalia MMP

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Note:
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Three Edge Bearing Test Report

Report No.: 6087, 6088 Date: 03-12-2024

1. General Information

Client Name:	Assistant Resident Engineer, Package III (PCP) Kamalia
Project Name:	Improvement of Sewage System and Construction of Waste Water Treatment Plant (WWTP)- Kamalia City (Punjab Cities Program)
Testing Facility:	On-Site three edge test set-up at Haider Precast Pipe Unit, Kamalia.
Client's letter No.:	MMP/1095/Kamalia/SEW/71/2024
Testing Date:	07-12-2024
Test performed by:	Dr. Safeer Abbas
Witnessed	Yes,Mian Muhammad Zubair Zafar (RE/PKG03 (PCP))

2. Pipe Details

Pipe material:	Reinforced concrete
Number of pipes:	08
Size of pipe:	12", 15", 18", 21", 24", 27", 30", and 36"
Curing:	Water ponding and water sprinkling

3. Test Set-up Details

Lower bearing:	Two wooden planks of rectangular cross-section were used. A rubber type strip was also attached at the top on the lower bearings.
Size of lower bearing:	12.9×13.5 cm and 13.4×14.3 cm
Distance between lower wooden planks used as lower bearing:	>25 mm (1 inch)
Upper bearings	One wooden plank of rectangular cross-section was used along with rubber type pad
Size of upper bearing wooden plank:	Cross-section: 15.9×11.3 cm Length: 212.9 cm
Thickness of upper bearing rubber strip:	8.5 cm thick
Loading mechanism:	Manual loading jack

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4. Testing Performance

The three-edge bearing test (TEBT) was conducted on reinforced concrete pipes at the site (Haider precast pipe unit, Kamalia), as per request of the client.The test was performed according to ASTM C497 and ASTM C76. The testing setup is shown in **Figure 1**. The test assembly consists of a steel frame. Pipe was horizontally placed on lower bearings (two wooden planks) in the test setup assembly at the site.After pipe placing, the upper bearing was positioned. A rubber bearing pad was placed between pipe and upper wooden bearings. Moreover, a steel beam was also placed between loading jack and upper wooden plank. The load was applied through a load jack attached to the frame. Load at 0.10-inch crack width and ultimate load were recorded. Crack width was manually measured using crack width gage. A calibrated load was determined using a calibration factor for that particular loading jack.

Figure 1: Experimental test setup at site.

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5. Observations and Calculations

Table 1: Measured dimensions of pipes

Pipes	Nominal pipe size (inches)	Mentioned Sr. No. *	Casting date *	Measured total length (cm)	Measured external diameter (cm)	Measured internal diameter (cm)	Average wall thickness (cm)
1	12	11	11-11-24	235.1	41.5	31.0	5.3
2	15	9	11-11-24	237.7	49.7	37.6	6.2
3	18	10	10-11-24	234.5	58.6	45.6	6.6
4	21	11	16-11-24	233.6	67.5	53.5	6.9
5	24	8	11-11-24	235.0	76.4	60.8	7.9
6	27	25	16-11-24	243.5	85.0	68.2	8.2
7	30	26	16-11-24	234.2	94.7	76.4	9.2
8	36	21	16-11-24	245.0	111.3	90.6	10.3

* *Mentioned Sr No. and Casting date was reported by the Client and site precast plant persons*

Table 2: Observed crack load and ultimate load

Pipes	Nominal pipe size (inches)	Distance between lower wooden planks (cm)	Crack load (0.01 in) (tons)	Ultimate load (tons)
1	12	2.8	20	22.5
2	15	3.0	18	21
3	18	3.9	15	19.5
4	21	4.4	16	20.5
5	24	5.6	12.5	15.5
6	27	6.4	21	29
7	30	6.8	20.5	31
8	36	8.2	27	38.5

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Table 3: Calibrated Crack load and ultimate load

Pipes	Nominal pipe size (inches)	Crack load (0.01 in) (lbs)	Ultimate load (lbs)
1	12	35010	39095
2	15	31743	36644
3	18	26841	34193
4	21	28475	35827
5	24	22757	27658
6	27	36644	49714
7	30	35827	52982
8	36	46447	65235

Table 4: Calculations for D-loads

Pipes	Nominal pipe size (inches)	Internal Diameter (ft)	Effective length (ft)	$D_{0.01}$load (lbs/ft/ft)	D_u load (lbs/ft/ft)
1	12	1.02	6.98	4917	5491
2	15	1.23	6.98	3697	4268
3	18	1.50	6.98	2564	3266
4	21	1.75	6.98	2331	2933
5	24	1.99	6.98	1638	1991
6	27	2.24	6.98	2344	3180
7	30	2.51	6.98	2045	3024
8	36	2.97	6.98	2240	3107

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6. Cracking Patterns

Figure 2: Cracking patterns.

Director
Test Floor Laboratory
Civil Engineering Department
UET Lahore.

I/C Testing Laboratoires
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Appendix A

Table A1: Reference value for D-load as per ASTM C76

Class of pipe	0.010 in Crack Load (lbs/ft/ft)	Ultimate Load (lbs/ft/ft)
Class I	*800*	*1200*
Class II	*1000*	*1500*
Class III	*1350*	*2000*
Class IV	*2000*	*3000*
Class V	*3000*	*3750*

Table A2: Other Information provided at the Site by Project Representatives

Concrete strength of pipe:	4000 psi
Reinforcement cage:	Single cage for 12”, 15”, 18”, 21”, 24”, 27” and 30” pipes Double cage for 36” pipe

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