Ali Raza Qureshi **Test Performed By:** Dr. /Engr. M Rizwan Riaz

Project Director (HVDC) NTDC Lahore

Client Reference: 1151-55/PD/HVDC/NTDC.LHR **Dated:** 28-05-2019

SOM Lab Ref: CED/SOM/916(Page-1/1) **Dated:** 30-05-2019

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^2	mm^2	kN	kN	MPa	MPa	MPa	MPa	mm	mm	%	
1	2.186	20	18.81	314	278	100.20	152.50	319	361	485	549	42.5	200	21.3	
2	2.162	20	18.73	314	275	99.50	150.50	317	362	479	547	45.0	200	22.5	
3	1.055	12	13.08	113	134	45.00	65.20	398	335	576	486	40.0	200	20.0	
4	0.973	12	12.56	113	124	48.70	69.50	431	393	615	561	37.5	200	18.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

20mm	Sample bend through 180 degrees Satisfactorily without any crack
12mm	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Six Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Resident Engineer,
Jaggran -II, Hydropower Consultants (JHC)

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

Client Reference: E314-L-JHC-RE-RPCC-OC-0 **Dated:** 27-05-2019
SOM Lab Ref: CED/SOM/918(Page-1/3) **Dated:** 30-05-2019
Test: Tension Test & Bend Test **Test Specification:** ASTM-F-1554
Sample Type: Deformed Bar (Nomee Steel) **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^2	mm^2	kN	kN	MPa	MPa	MPa	MPa	mm	mm	%	
1	3.910	25	25.18	491	498	257.50	328.50	525	518	669	660	37.5	200	18.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

25mm	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Two Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Resident Engineer,
Jaggran -II, Hydropower Consultants (JHC)

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

Client Reference: E314-L-JHC-RE-RPCC-OC-0 **Dated:** 27-05-2019
SOM Lab Ref: CED/SOM/918(Page-1/3) **Dated:** 30-05-2019
Test: Tension Test **Test Specification:** ASTM-F-1554
Sample Type: J-Bolt **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^2	mm^2	kN	kN	MPa	MPa	MPa	MPa	mm	mm	%	
1	4.896	28	28.19	616	624	239.50	349.70	389	384	568	561	52.5	200	26.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

--	No Bend test performed

Note:-

Only One Sample Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Resident Engineer,
Jaggran -II, Hydropower Consultants (JHC)

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

Client Reference: E314-L-JHC-RE-RPCC-OC-098 **Dated:** 27-05-2019
SOM Lab Ref: CED/SOM/918(Page-2/3) **Dated:** 30-05-2019
Test: Tension Test & Bend Test **Test Specification:** ASTM-F-1554
Sample Type: Deformed Bar (Pak Steel) **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^2	mm^2	kN	kN	MPa	MPa	MPa	MPa	mm	mm	%	
1	2.065	19	18.30	284	263	111.50	163.00	393	424	575	620	35.0	200	17.5	
2	1.550	16	15.86	201	197	89.50	116.50	445	454	579	591	35.0	200	17.5	
3	1.053	13	13.07	133	134	59.50	87.70	448	444	661	655	37.5	200	18.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

19mm	Sample bend through 180 degrees Satisfactorily without any crack
216mm	Sample bend through 180 degrees Satisfactorily without any crack
13mm	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Six Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Resident Engineer,
Jaggran -II, Hydropower Consultants (JHC)

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

Client Reference: E314-L-JHC-RE-RPCC-OC-0 **Dated:** 27-05-2019
SOM Lab Ref: CED/SOM/918(Page-1/3) **Dated:** 30-05-2019
Test: Tension Test & Bend Test **Test Specification:** ASTM-F-1554
Sample Type: Deformed Bar (Nomee Steel) **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^2	mm^2	kN	kN	MPa	MPa	MPa	MPa	mm	mm	%	
1	3.910	25	25.18	491	498	257.50	328.50	525	518	669	660	37.5	200	18.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

25mm	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Two Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Engr. Muhammad Abdullah
Assistant Engineer, B & W Department, U. E. T. Lahore

Test Performed By: **Dr. /Engr.** **M Rizwan Azam**

Client Reference: **B & W/AEN/961**
Dated: **30-05-2019**

SOM Lab Ref: **915 (Page-1/1)**
Dated: **30-05-2019**

Test: **Tension Test & Bend Test**
Test Specification: **ASTM-A-615 Deformed**
Gauge Length: **8 inch**
Sample Type: **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^2	in^2	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	1.065	5	0.631	0.31	0.313	12.49	15.29	88840	87990	108780	107740	0.90	8.0	11.3	
2	1.072	5	0.633	0.31	0.315	12.03	14.88	85580	84220	105880	104200	0.80	8.0	10.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

# 5	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Three Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Syed Mohsin Ali **Test Performed By:** **Dr. /Engr.** **M Rizwan Azam**

Manager QA/QC, Department, Bahria Town, (Pvt) Ltd Lahore

Client Reference: **QA/QC-Steel-1446** **SOM Lab Ref:** **917(Page-1/1)**

Dated: **29-05-2019** **Dated:** **30-05-2019**

Test: **Tension Test & Bend Test** **Test Specification:** **ASTM-A-615**

Gauge Length: **8 inch** **Sample Type:** **Deformed Bar(AGS 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^2	in^2	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	2.613	8	0.989	0.79	0.768	29.56	38.20	82530	84890	106630	109690	1.20	8.0	15.0	
2	2.728	8	1.011	0.79	0.802	26.81	35.78	74850	73730	99890	98390	1.40	8.0	17.5	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

# 8	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Three Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Sub Divisional Officer
Buildings Sub Division, Shakargarh

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

Client Reference: **1471/Sg**
Dated: **08-04-2019**

SOM Lab Ref: **920 (Page-1/1)**
Dated: **30-05-2019**

Test: **Tension Test & Bend Test** **Test Specification:** **ASTM-A-615 Deformed**

Gauge Length: **8 inch** **Sample Type:** **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^2	in^2	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	1.519	6	0.754	0.44	0.446	10.56	15.19	52940	52230	76130	75110	1.60	8.0	20.0	
2	0.680	4	0.505	0.20	0.200	5.05	7.14	55650	55650	78690	78690	1.40	8.0	17.5	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	0.379	3	0.376	0.11	0.111	6.24	8.02	125080	123950	160850	159400	1.20	8.0	15.0	
5	0.367	3	0.371	0.11	0.108	8.18	9.73	163910	166950	195180	198790	1.00	8.0	12.5	
6	0.418	3	0.396	0.11	0.123	7.03	9.60	141020	126120	192520	172180	1.10	8.0	13.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

# 6	Sample bend through 180 degrees Satisfactorily without any crack
# 4	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Four Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Wasif Manzoor
Salman Developers Lahore

Test Performed By: Dr. /Engr. **M Rehan Ashraf**

Client Reference: nil
Dated: 05-12-2018

SOM Lab Ref: 921(Page-1/1)
Dated: 30-05-2019

Test: Tension Test & Bend Test
Test Specification: ASTM-A-615 Deformed
Gauge Length: 8 inch
Sample Type: 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^2	in^2	Tons	Tons	psi	psi	psi	psi	in	in	%	
1	2.559	8	0.979	0.79	0.752	23.55	33.20	65740	69060	92690	97370	1.30	8.0	16.3	
2	1.505	6	0.750	0.44	0.442	15.90	21.83	79710	79350	109450	108950	1.00	8.0	12.5	
3	0.668	4	0.500	0.20	0.196	6.01	8.77	66320	67680	96670	98650	1.30	8.0	16.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

BEND TEST:

# 8	Sample bend through 180 degrees Satisfactorily without any crack
# 6	Sample bend through 180 degrees Satisfactorily without any crack
# 4	Sample bend through 180 degrees Satisfactorily without any crack

Note:-

Only Six Samples Received and Tested

Note: Please always confirm the results of above report on web www.uet-civil.edu.pk

Test Performed by: Dr. Asad Ali Gillani

Resident Engineer,
Jaggran – II, Hydropwer Consultants, (JHC)

Client Reference No.: E314-L-JHC-RE-EPCC-OC-0/110 **Dated: 27-05-2019**
SOM Lab Ref: CED/SOM/918 (Page-3/3) **Dated: 30-05-2019**
Test Type: Slippage Test & Hardness Test
Sample Type: Rock -Bolt (25mm Diameter, Nomee Steel)

Slippage Test Results

Sample No.	Sample Type	Diameter of Bolt (mm)	Maximum Load Applied (kN)	Remarks
1	Rock-Bolt	25	226.5	Thread Failure

Hardness Test Details:

Machine used: Avery Rockwell Hardness Testing Machine
(Minor Load: 10 Kgf Major Load: 140.0 kgf Scale: C)
(Minor Load: 10 Kgf Major Load: 90.0 kgf Scale: B)

Hardness Test Results

Sample No.	Sample Type	Sample Size(mm)	Hardness
1	J-Bolt (Deformed bar)	25	HR -10.33 – C
2	Nut	25	HR – 77.00 – B

Witness By: Muhammad Hussain, Material Engr. (JHC)
Note: Please always confirm the results on web www.uet-civil.edu.pk

Test Performed by: Dr.S. Asad Ali Gillani

Resident Engineer
EA Consulting (Pvt) Ltd.
Sukkur ~ Multan Motorway Project Section – III

Client Reference No.: CRE/EA/M.P-III/423 -2019 **Dated: 30-05-2019**

SOM Lab Ref: CED/SOM/922(P-1/1) **Dated: 30-05-2019**

Test Type: Tensile Test

Sample Type: Expansion Bolt M12 ,

Tensile Test Results

Sample No.	Sample Type	Tensile Load at Slippage (kN)	Tensile Stress at Slippage Load(MPa)	Remarks
1	Expansion Bolt (M 12)	22.2	196	Thread Failure
2	Expansion Bolt (M 12)	24.7	218	Thread Failure

Note: Please always confirm the results on web www.uet-civil.edu.pk