



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

To,

Assistant Resident Engineer
MM Pakistan (Pvt) Ltd.
Improvement of Sewerage System and Construction of Waste Water Treatment Plant
(WWTP) – Kamalia City., Package-1 Sewerage System.

Reference # CED/TFL **5974** (Dr. Usman Akmal)

Dated: 08-11-2024

Reference of the request letter # MMP/1095/KCM/SEW/56/2024

Dated: 06-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2024

Gauge length 8 inches

Description Plain & 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	0.103	3/16	0.196	-----	0.030	1040	1360	-----	76020	-----	99500	1.20	15.0	
2	0.096	3/16	0.190	-----	0.028	1080	1240	-----	84390	-----	96900	0.40	5.0	
3	0.221	1/4	0.287	-----	0.065	2480	3160	-----	84290	-----	107400	1.10	13.8	
4	0.217	1/4	0.285	-----	0.064	2360	3080	-----	81560	-----	106500	0.90	11.3	
5	0.379	3/8	0.376	0.11	0.111	3400	5400	68200	67350	108200	107000	1.00	12.5	
6	0.339	3/8	0.356	0.11	0.100	2200	3000	44100	48640	60200	66400	1.30	16.3	

Note: only six samples for tensile and three samples for bend test

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Bend Test

3/16" Dia Bar Bend Test Through 180° is Satisfactory

1/4" Dia Bar Bend Test Through 180° is Satisfactory

3/8" Dia Bar Bend Test Through 180° is Satisfactory

Witness by M Shafiq (ARE, MMP, Package-3, (PCP) Kamalia)

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,

Incharge QC Civil
Elite Engineering Pvt. Ltd.

Rehabilitation & Additional Works at:

- (I) Govt. College of Technology, Allama Iqbal Town, Lahore.
- (II) Vocational Training Institute, Lahore.
- (III) Govt. College of Technology (Women), Lahore.
- (IV) Govt. Technical Institute, Sheikhpura.

Reference # CED/TFL **6000** (Dr. Usman Akmal)

Dated: 15-11-2024

Reference of the request letter # EEPL/UET/10400/25-24

Dated: 13-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2023

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	0.382	3	0.378	0.11	0.112	3600	5100	72200	70640	102200	100100	1.10	13.8	
2	0.369	3	0.372	0.11	0.109	3500	5000	70200	71070	100200	101600	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 Laboratories
UET Lahore, Pakistan.

Note:

- 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
- The above results pertain to sample /samples supplied to this laboratory.
- 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
HMB Developers (Pvt) Ltd.
Commercial Tower, FTC Lahore.

Reference # CED/TFL **6001** (Dr. Usman Akmal)
Reference of the request letter # HMBDPL/S.O/11/141 (LHR)

Dated: 15-11-2024
Dated: 15-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2024
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	0.371	3	0.373	0.11	0.109	3500	4900	70200	70650	98200	99000	1.50	18.8	
2	0.371	3	0.373	0.11	0.109	3200	4600	64200	64700	92200	93000	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 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,

M/S Banu Mukhtar Steel (Pvt) Ltd.
Lahore

Reference # CED/TFL **6003** (Dr. Usman Akmal)
Reference of the request letter # BMSQA.QC-068/24

Dated: 15-11-2024

Dated: 12-11-2024

Tension Test Report (Page – 1/1)

Date of Test 19-11-2024
Gauge length 2 inches
Description HR Plate 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	PL-01	20	24.90x20.50	510.45	18500	26600	356	511	1.00	50.00	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
Only One Sample for Tensile Test											
Bend Test											

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,

M/S Arctic Spinning
Faisalabad

(Construction of Blow Room Extension at Arctic Div-II. Artic Spinning, 4-km Shorkot Road, Toba Tek Singh.)(M/s Saleem Construction Company.)

Reference # CED/TFL **6004** (Dr. Usman Akmal)

Dated: 15-11-2024

Reference of the request letter # Arctic/I/CIVIL/24-110

Dated: 15-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2023

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	0.375	3	0.375	0.11	0.110	4400	5400	88200	87890	108200	107900	0.80	10.0	Kisan Steel
2	0.371	3	0.373	0.11	0.109	4300	5300	86200	86800	106200	107000	0.70	8.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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:

- 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,

Manager Civil
HSM Engineering
Construction of Diesel Storage Tank at Attock Petroleum Railway Road Sialkot (Askari iv)

Reference # CED/TFL **6005** (Dr. Usman Akmal)
Reference of the request letter # Nil

Dated: 15-11-2024
Dated: 15-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2023
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	3800	5100	76200	75540	102200	101400	1.00	12.5	
2	0.377	3	0.376	0.11	0.111	3800	5000	76200	75540	100200	99400	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 Laboratories
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,

Project Manager
Sunshina Health Care Private Limited.
Sunshine Medical Tower Shahdra.

Reference # CED/TFL **6006** (Dr. Usman Akmal)
Reference of the request letter # Nil

Dated: 15-11-2024
Dated: 15-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2024
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	0.373	3	0.374	0.11	0.110	4200	4900	84200	84390	98200	98500	0.90	11.3	
2	0.371	3	0.372	0.11	0.109	4000	4800	80200	80950	96200	97200	0.90	11.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile and one samples 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,

Resident Engineer

NESPAK

Restoration / Improvement of Gunjial to Warcha Road, Length = 11.50 km in District Khushab.

Reference # CED/TFL **6007** (Dr. Usman Akmal)

Dated: 15-11-2024

Reference of the request letter # RE/4834/MIJ/24/22

Dated: 31-10-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2023

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	0.375	3	0.375	0.11	0.110	3500	4600	70200	69910	92200	91900	1.20	15.0	Mughal Supreme
2	0.380	3	0.377	0.11	0.112	4200	5300	84200	82810	106200	104500	0.90	11.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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,

Incharch (Civil)
For Managing Director
Sui Northern Gas Pipelines Limited.
Construction of Underground Water Tank for Fire Fighting at Regional Distribution
Office Lahore.

Reference # CED/TFL **6008** (Dr. Usman Akmal)

Dated: 18-11-2024

Reference of the request letter # CC/UGWT/RDO/LHR

Dated: 14-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2023

Gauge length 8 inches

Description Deformed Steel Bar Tensile Test as per ASTM-A615

Sr. No.	Weight	Diameter/ Size (inch)		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	0.367	3/8	0.371	0.11	0.108	3800	4900	76200	77680	98200	100200	1.00	12.5	
2	0.364	3/8	0.369	0.11	0.107	3800	4800	76200	78240	96200	98900	1.10	13.8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Note: only two samples for tensile test														
Bend Test														

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,

M/S Riaz Construction Company
Lahore
(Karnkay High School, Lahore Cantt)

Reference # CED/TFL **6009** (Dr. Usman Akmal)
Reference of the request letter # Nil

Dated: 18-11-2024
Dated: 18-11-2024

Tension Test Report (Page # 1/1)

Date of Test 19-11-2024
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	0.384	3	0.379	0.11	0.113	3500	5400	70200	68260	108200	105400	1.30	16.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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 Laboratories
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,

Principal Architect
Z. H. Kazmi & Associates
HBL Bank Limited Railway Road Relocation Branch 0405 Gujrat.

Reference # CED/TFL **6011** (Dr. Usman Akmal)
Reference of the request letter # Nil

Dated: 18-11-2024
Dated: 18-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2023
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	0.371	3	0.373	0.11	0.109	4000	4900	80200	80810	98200	99000	0.80	10.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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 Laboratories
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,

M/S Ahmad Associates
Lahore
(Project 18km Lahore Kasur Road Sufiabab Descon Lahore.)

Reference # CED/TFL **6016** (Dr. Usman Akmal)
Reference of the request letter # IAA-200445

Dated: 18-11-2024
Dated: 18-11-2024

Tension Test Report (Page -1/1)

Date of Test 19-11-2023
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	0.362	3	0.368	0.11	0.106	3200	4600	64200	66340	92200	95400	1.00	12.5	Kamran Steel
2	0.362	3	0.368	0.11	0.106	3200	4600	64200	66250	92200	95300	0.80	10.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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.

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