

Transportation Engineering Laboratory (TEL)

Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE – 54890 (PAKISTAN)



Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref:-----

Date:-----

Mr. Muhammad Zain-Ul-Abadeen
Resident Engineer,
NESPAK, Lahore.

Subject: **Testing of Coarse Aggregate**

Tender No. XEN(O&M-I) NT/2024-25/83 - Improvement of Water Supply and
Sewerage System in UC-235, Nishter Zone, Lahore

Dear Sir,

It is with reference to your letter No. 43101/MZA/01/1059 dated 03-01-2025.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 14-01-2025 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	3/4"	1/2"	3/8"	#4
%age Passing	100	77.46	28.42	0

2. Specific Gravity & Water Absorption (ASTM C-127)

Specific Gravity (oven dried condition)	2.81
Specific Gravity (saturated surface dry condition)	2.83
Apparent Specific Gravity	2.86
Water Absorption (%)	0.62

3. Sodium Sulphate Soundness (ASTM C-88)

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
1/2" + 3/8"	1004.3	991.2	1.30	0.93
	Total = 0.93%			

4. Los Angeles Abrasion Value Test (ASTM C-131/535)

Grading Used	Los Angeles Abrasion Value (%)
B	19.50

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
$\frac{3}{4}$	$\frac{1}{2}$	14.23	3.21	13.59	3.06
$\frac{1}{2}$	$\frac{3}{8}$	12.18	5.97	14.49	7.11
$\frac{3}{8}$	$\frac{1}{4}$	11.65	3.31	16.15	4.59
Flakiness Index = 12.49%			Elongation Index = 14.76%		

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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Ref.:-----

Date:-----

Mr. Muhammad Zain-Ul-Abadeen

Resident Engineer,

NESPAK, Lahore.

Subject: **Testing of Bedding Material of Sewer Pipe**

Tender No. XEN(O&M-I) NT/2024-25/83-Improvement of Water Supply and Sewerage System in UC-235, Nishter Zone, Lahore

Dear Sir,

It is with reference to your letter No. 43101/MZA/01/1053 dated 03-01-2025.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 14-01-2025 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	95.42	83.94	21.84	0.82	0	0	0

2. Specific Gravity & Water Absorption (ASTM C-127)

Specific Gravity (oven dried condition)	2.70
Specific Gravity (saturated surface dry condition)	2.72
Apparent Specific Gravity	2.75
Water Absorption (%)	0.64

3. Sodium Sulphate Soundness (ASTM C-88)

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
1" + 3/4"	1508.0	1491.3	1.11	0.92
	Total = 0.92%			

4. Los Angeles Abrasion Value Test (ASTM C-131/535)

Grading Used	Los Angeles Abrasion Value (%)
A	21.66

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
2 ½	2	0	0	0	0
2	1 ½	6.68	0.77	7.28	0.84
1 ½	1	9.08	5.64	20.68	12.84
1	¾	5.87	1.23	10.20	2.14
¾	½	0	0	68.59	0.57
Flakiness Index = 7.64%			Elongation Index = 16.39%		

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Director
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Ref.:-----

Date:-----

Mr. Jawad Qayyum Khan
Resident Engineer,
NESPAK, Sargodha.

Subject: **Testing of Cores of Asphaltic Wearing Course**
Restoration/Improvement of Arterial-III Sheikhupura Faisalabad Jhang
Bhakkar Darya Khan Road, Length = 107.82 km, District Bhakkar

Dear Sir,

It is with reference to your letter No. RE/4834/JQK/25/7462 dated 03-02-2025.
Please find below the results for the tests conducted on asphalt concrete cores provided to
this laboratory on 14-02-2025 through your representative.

BULK SPECIFIC GRAVITY OF COMPACTED ASPHALT (ASTM D2726):

Core	Mean Thickness (cm)	Mean Diameter (cm)	Bulk Specific Gravity
1	5.267	9.200	2.388
2	4.300	9.200	2.416
3	5.847	9.200	2.391
4	4.467	9.200	2.382
5	4.913	9.200	2.393
6	6.400	9.200	2.394
7	5.263	9.200	2.389
8	5.283	9.200	2.404
9	4.960	9.200	2.384
10	5.300	9.200	2.383
11	5.213	9.200	2.403
12	5.343	9.200	2.391
13	5.817	9.200	2.447
14	5.833	9.200	2.463
15	5.963	9.200	2.392
16	5.153	9.200	2.396
17	4.900	9.200	2.389
18	4.773	9.200	2.404
19	4.957	9.200	2.388
20	4.603	9.200	2.398

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Ref.:-----

Date:-----

Mr. Jawad Qayyum Khan
Resident Engineer,
NESPAK, Sargodha.

Subject: **Testing of Chunks of Asphaltic Wearing Course**
Restoration/Improvement of Arterial-III Sheikhpura Faisalabad Jhang
Bhakkar Darya Khan Road, Length = 107.82 km, District Bhakkar

Dear Sir,

It is with reference to your letter No. RE/4834/JQK/25/7460 dated 03-02-2025.
Please find below the results for the tests conducted on asphalt concrete chunks provided to this laboratory on 14-02-2025 through your representative.

BITUMEN EXTRACTION TEST: (Chunks)

Sample # 1 (AWC)

Bitumen Extraction Value (ASTM D-2172)							4.25%	
Gradation Analysis								
Sieve No.	1"	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	95.00	85.00	64.01	42.02	25.02	9.03	5.05

Sample # 2 (AWC)

Bitumen Extraction Value (ASTM D-2172)							4.26%	
Gradation Analysis								
Sieve No.	1"	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	96.01	83.00	64.99	42.98	23.98	8.48	4.49

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Ref.-----

Date:-----

Mr. Jawad Qayyum Khan
Resident Engineer,
NESPAK, Sargodha.

Subject: **Testing of Cores of Asphaltic Base Course**
Restoration/Improvement of Arterial-III Sheikhupura Faisalabad Jhang
Bhakkar Darya Khan Road, Length = 107.82 km, District Bhakkar

Dear Sir,

It is with reference to your letter No. RE/4834/JQK/25/7461 dated 03-02-2025.
Please find below the results for the tests conducted on asphalt concrete cores provided to
this laboratory on 14-02-2025 through your representative.

BULK SPECIFIC GRAVITY OF COMPACTED ASPHALT (ASTM D2726):

Core	Mean Thickness (cm)	Mean Diameter (cm)	Bulk Specific Gravity
1	7.267	9.300	2.436
2	7.410	9.300	2.419
3	6.983	9.300	2.422
4	7.930	9.300	2.423
5	8.003	9.300	2.429
6	7.803	9.300	2.476
7	6.983	9.300	2.429
8	7.140	9.300	2.440
9	6.860	9.300	2.478
10	6.850	9.300	2.452
11	7.440	9.300	2.426
12	6.717	9.300	2.463
13	6.707	9.300	2.406
14	7.463	9.300	2.432
15	7.543	9.300	2.402
16	7.843	9.300	2.465
17	8.160	9.300	2.457
18	8.230	9.300	2.494
19	8.310	9.300	2.425
20	8.140	9.300	2.433

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Mr. Jawad Qayyum Khan
Resident Engineer,
NESPAK, Sargodha.

Subject: **Testing of Chunks of Asphaltic Base Course**
Restoration/Improvement of Arterial-III Sheikhpura Faisalabad Jhang
Bhakkar Darya Khan Road, Length = 107.82 km, District Bhakkar

Dear Sir,

It is with reference to your letter No. RE/4834/JQK/25/7459 dated 03-02-2025.
Please find below the results for the tests conducted on asphalt concrete chunks provided to this laboratory on 14-02-2025 through your representative.

BITUMEN EXTRACTION TEST: (Chunks)

Sample # 1 (ABC)

Bitumen Extraction Value (ASTM D-2172)								3.72%	
Gradation Analysis									
Sieve No.	1 ½"	1"	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	89.00	75.01	65.00	49.99	33.99	19.98	8.47	4.46

Sample # 2 (ABC)

Bitumen Extraction Value (ASTM D-2172)								3.72%	
Gradation Analysis									
Sieve No.	1 ½"	1"	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	88.00	74.01	66.01	49.02	35.03	19.03	8.02	4.02

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Ref.:-----

Date:-----

Engr. Sheikh Maqbool Hassan
Resident Engineer, NESPAK,
MCL Nishtar Zone, Lahore.

Subject: **Testing of Aggregate (Granular Sub-base)**
Construction of Metalled Road from Manak Road to Bahria Road to WAPDA
Society Road, Allama Iqbal Zone MCL

Dear Sir,

It is with reference to your letter No. 4084/103/LDP/NZ/04/240 dated 03-03-2025.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 07-03-2025 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	100	79.52	60.43	37.72	24.47	19.02

2. Los Angeles Abrasion Value Test (ASTM C-131/535)

Grading Used	Los Angeles Abrasion Value (%)
A	28.11

3. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
1 1/2	1	25.83	6.53	27.09	6.85
1	3/4	23.82	5.61	31.75	7.48
3/4	1/2	26.71	7.49	30.58	8.57
1/2	3/8	25.63	4.19	33.00	5.40
3/8	1/4	13.43	0.90	22.17	1.49
Flakiness Index = 24.72%			Elongation Index = 29.79%		

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TEL UET

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Ref.:-----

Date:-----

Engr. Sheikh Maqbool Hassan
Resident Engineer, NESPAK,
MCL Nishtar Zone, Lahore.

Subject: **Testing of Base Course/WBM Material**

Construction of Metalled Road from Manak Road to Bahria Road to WAPDA
Society Road, Allama Iqbal Zone MCL

Dear Sir,

It is with reference to your letter No. 4084/103/LDP/NZ/04/238 dated 03-03-2025.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 07-03-2025 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	3"	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	77.82	16.53	0.55	0	0	0	0	0

2. Specific Gravity & Water Absorption (ASTM C-127)

Specific Gravity (oven dried condition)	2.70
Specific Gravity (saturated surface dry condition)	2.71
Apparent Specific Gravity	2.74
Water Absorption (%)	0.50

3. Los Angeles Abrasion Value Test (ASTM C-131/535)

Grading Used	Los Angeles Abrasion Value (%)
1	20.29

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Ref.:-----

Date:-----

Engr. Mazhar Latif
General Manager (Projects),
Habib Rafiq Engineering (Pvt.) Limited,
Lahore.

Subject: **Testing of Bitumen – AASHTO Standard (M-20)**
Development of One Central Vista Project, Lahore

Dear Sir,

It is with reference to your letter No. L-1C-MISC-25-0030 dated 28-03-2025.

Please find below the results of tests conducted on the bitumen sample provided to this laboratory through your representative.

Sr.#	Laboratory Tests	Results
1	Penetration (ASTM D-5)	66 Units
2	Penetration of Residue (ASTM D-5)	58 Units
3	Ductility (ASTM D-113)	Above 100 cm
4	Ductility of Residue (ASTM D-113)	Above 100 cm
5	Flash Point (ASTM D-92)	298°C
6	Solubility (ASTM D-2042)	99.80%
7	Specific Gravity Value (ASTM D-70)	1.021
8	Thin Film Oven Test Value (ASTM D-1754)	0.476%

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