

# 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. Rashid Kamran  
Resident Engineer,  
NESPAK.

Subject: **Testing of Bitumen**  
Construction of Electric Bus Depot at Green Town, Lahore

Dear Sir,

It is with reference to your letter No. 4792/13/RK/05/16 dated 26-12-2024.  
Please find below the results of tests conducted on the bitumen sample provided to this laboratory on 15-01-2025 through your representative.

Sr.#	Laboratory Tests	Results
1	Penetration (ASTM D-5)	65 Units
2	Flash Point (ASTM D-92)	308°C
3	Specific Gravity Value (ASTM D-70)	1.021
4	Loss on Heating Value (ASTM D-6)	0.237%

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

Best Regards,

Director  
Transportation Engineering Laboratory

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

Ref.:-----

Date:-----

Mr. Abid Azim  
Resident Engineer,  
Ravi Zone, NESPAK.

Subject: **Testing of Aggregate (Granular Sub-base)**  
Rehabilitation/Improvement of Street Pavement, Sewerage/Drainage, Chaman Colony, Sattar Colony, Chimbay Wala, Mohallah Achar Wali Factory, Shahdra UC 04/05, Ravi Zone MCL

Dear Sir,

It is with reference to your letter No. 4084/103/LDP/Ravi/04/52 dated 20-01-2025. Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

## 1. Sieve Analysis (ASTM C-136)

Sieve Size	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	84.73	52.57	29.30	20.85	13.69

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

Grading Used	Los Angeles Abrasion Value (%)
A	20.52

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

Best Regards,

Director  
Transportation Engineering Laboratory

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

Ref.:-----

Date:-----

Mr. Muhammad Zaki  
Resident Engineer,  
NESPAK.

Subject: **Testing of Sand Material (Ravi Sand)**  
Rehabilitation/Improvement of Street (P.C.C), Sewerage/Drainage UC 79(A), 82,  
83, 86, 87, 88, 89, 90, 91, 92, 94, 107, 218(B) amanabad Zone, MCL

Dear Sir,

It is with reference to your letter No. 4084/103/LDP/GULBERG/04/22 dated 21-01-2025.  
Please find below the results for the tests conducted on the aggregate sample provided to this  
laboratory through your representative.

## Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.68	99.03	98.03	96.90	81.50	10.35	1.99

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Transportation Engineering Laboratory

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Ref.:-----

Date:-----

Mr. Abid Azim  
Resident Engineer,  
Ravi Zone, NESPAK.

Subject: **Testing of Granular Sub-base Material**  
Rehabilitation/Improvement of Roads Iqbal Park, Railway Colony, Mandar Dhiyan  
Singh, Molana Ahmed Ali Road & Lorry Adda UC 17 Ravi Zone MCL

Dear Sir,

It is with reference to your letter No. 4084/103/LDP/Ravi/04/116 dated 23-01-2025.  
Please find below the results for the tests conducted on the aggregate sample provided to this  
laboratory through your representative.

## 1. Sieve Analysis (ASTM C-136)

Sieve Size	2"	1"	3/8"	#4	#10	#40	#200
%age Passing	100	78.15	58.18	42.23	35.15	24.01	8.98

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

Grading Used	Los Angeles Abrasion Value (%)
A	24.30

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Ref.:-----

Date:-----

Mr. Abid Azim  
Resident Engineer,  
Ravi Zone, NESPAK.

Subject: **Testing of Sand Material**

Rehabilitation/Improvement of Roads Iqbal Park, Railway Colony, Mandar Dhiyan  
Singh, Molana Ahmed Ali Road & Lorry Adda UC 17 Ravi Zone MCL

Dear Sir,

It is with reference to your letter No. 4084/103/LDP/Ravi/04/115 dated 23-01-2025.

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

## 1. Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.65	99.09	98.34	97.19	80.87	9.61	1.73

## 2. Fineness Modulus (ASTM C-142)

Fineness Modulus (%)	1.15
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Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref:-----

Date:-----

The Executive Engineer,  
Highway Division, Narowal.

Subject: **Testing of Various Construction Materials (Coarse and Fine Aggregates)**  
Rehabilitation/Reconstruction of Road from Narowal to Muridke  
(Length, km No. 0.00 to 33.21 = 33.21 km) up to District Boundary in District Narowal

Dear Sir,

It is with reference to your letter No. 1957/CB dated 28-11-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## Coarse Aggregate

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.11

## Sub-base (Re-use)

### Sieve Analysis (ASTM C-136)

Sieve Size	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	81.08	64.38	58.44	55.46	49.76

## Fine Aggregate (Sand)

### Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	100	99.83	99.60	99.44	98.99	44.26	12.46

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Ref.:-----

Date:-----

The Executive Engineer,  
Highway Division, Narowal.

Subject: **Testing of Various Construction Materials (Coarse and Fine Aggregates)**  
Rehabilitation/Reconstruction of Road from Narowal to Muridke  
(Length, km No. 0.00 to 33.21 = 33.21 km) up to District Boundary in District Narowal

Dear Sir,

It is with reference to your letter No. 1959/CB dated 28-11-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## Coarse Aggregate

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.34

## Sub-base (Re-use)

### 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	97.78	93.52	76.10	60.86	55.82	52.31	47.50

## Fine Aggregate (Sand)

### Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	100	99.77	99.57	99.39	98.90	44.15	12.03

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The Executive Engineer,  
Highway Division, Narowal.

Subject: **Testing of Various Construction Materials (Coarse and Fine Aggregates)**  
Rehabilitation/Reconstruction of Road from Narowal to Muridke  
(Length, km No. 0.00 to 33.21 = 33.21 km) up to District Boundary in District Narowal

Dear Sir,

It is with reference to your letter No. 1960/CB dated 28-11-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## Coarse Aggregate

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.74

## Sub-base (Re-use)

### Sieve Analysis (ASTM C-136)

Sieve Size	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	98.69	79.67	63.31	57.77	54.60	49.51

## Fine Aggregate (Sand)

### Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	100	99.80	99.63	99.48	99.03	44.25	11.17

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Ref:-----

Date:-----

The Executive Engineer,  
Highway Division, Narowal.

Subject: **Testing of Various Construction Materials (Coarse and Fine Aggregates)**  
Rehabilitation/Reconstruction of Road from Narowal to Muridke  
(Length, km No. 0.00 to 33.21 = 33.21 km) up to District Boundary in District Narowal

Dear Sir,

It is with reference to your letter No. 1961/CB dated 28-11-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## Coarse Aggregate

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.83

## Sub-base (Re-use)

### Sieve Analysis (ASTM C-136)

Sieve Size	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	99.14	81.01	63.97	57.85	52.88	47.71

## Fine Aggregate (Sand)

### Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	100	99.83	99.63	99.37	98.77	44.54	11.73

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Ref.:-----

Date:-----

The Executive Engineer,  
Highway Division, Narowal.

Subject: **Testing of Various Construction Materials (Coarse and Fine Aggregates)**  
Rehabilitation/Reconstruction of Road from Narowal to Muridke  
(Length, km No. 0.00 to 33.21 = 33.21 km) up to District Boundary in District Narowal

Dear Sir,

It is with reference to your letter No. 1962/CB dated 28-11-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## Coarse Aggregate

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.07

## Sub-base (Re-use)

### Sieve Analysis (ASTM C-136)

Sieve Size	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	81.59	64.71	57.88	52.69	47.84

## Fine Aggregate (Sand)

### Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	100	99.80	99.65	99.39	98.84	44.81	12.51

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Ref:-----

Date:-----

The Executive Engineer,  
Highway Division, Narowal.

Subject: **Testing of Various Construction Materials (Coarse and Fine Aggregates)**  
Rehabilitation/Reconstruction of Road from Narowal to Muridke  
(Length, km No. 0.00 to 33.21 = 33.21 km) up to District Boundary in District Narowal

Dear Sir,

It is with reference to your letter No. 1963/CB dated 28-11-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## Coarse Aggregate

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

Grading Used	Los Angeles Abrasion Value (%)
B	17.05

## Sub-base (Re-use)

### Sieve Analysis (ASTM C-136)

Sieve Size	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	99.08	81.07	65.00	59.23	54.95	49.75

## Fine Aggregate (Sand)

### Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	100	99.84	99.64	99.34	98.78	45.25	12.36

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Ref.-----

Date:-----

The Executive Engineer,  
Highway Division, Narowal.

Subject: **Testing of Water Bound Macadam (Base “Reuse”)**  
Rehabilitation/Reconstruction of Road from Narowal to Muridke  
(Length, km No. 0.00 to 33.21 = 33.21 km) up to District Boundary in District Narowal

Dear Sir,

It is with reference to your letter No. 1965/CB dated 28-11-2024.  
Please find below the results for the tests conducted on the WBM sample provided to this laboratory through your representative.

## 1. Sieve Analysis (ASTM C-136)

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	75.80	39.42	31.82	25.88	20.80	18.72	17.31	16.15

## 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	2.76
Water Absorption (%)	0.77

## 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.
2” + 1 ½”	5004.4	4982.4	0.44	0.19
	Total = 0.19%			

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

Grading Used	Los Angeles Abrasion Value (%)
1	24.39

## 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.)				
3	2 ½	0	0	0	0
2 ½	2	7.27	3.15	10.11	4.39
2	1 ½	6.58	0.60	8.11	0.74
1 ½	1	7.64	0.54	8.46	0.60
1	¾	7.86	0.48	8.32	0.50
¾	½	7.71	0.19	9.26	0.23
½	⅜	8.76	0.15	10.02	0.17
⅜	¼	6.69	0.09	7.15	0.10
Flakiness Index = 5.20%			Elongation Index = 6.73%		

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Transportation Engineering Laboratory

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