

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:-----

The Executive Engineer,
Highways Division,
Narowal.

Subject: **Testing of Asphalt Base Course**

Project: Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison,
Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1035/DB dated 10-06-2024.

Please find below the results for the tests conducted on the ABC samples provided to this laboratory on 03-07-2024 through your representative.

BULK SPECIFIC GRAVITY OF COMPACTED ASPHALT (ASTM D2726):

Core	Mean Thickness (cm)	Mean Diameter (cm)	Bulk Specific Gravity
1	7.693	10.500	2.342
2	6.613	10.500	2.395
3	7.017	10.500	2.394
4	6.770	10.500	2.416
5	7.023	10.500	2.420
6	6.583	10.500	2.412
7	6.823	10.500	2.422
8	6.127	10.500	2.436
9	6.867	10.500	2.411
10	6.633	10.500	2.486
11	6.370	10.500	2.436
12	6.250	10.500	2.415
13	9.300	10.500	2.409
14	5.843	10.500	2.404
15	6.457	10.500	2.468

BITUMEN EXTRACTION TEST: (Chunk)

Bitumen Extraction Value (ASTM D-2172)							4.41%		
Gradation Analysis									
Sieve No.	1"	¾"	½"	3/8"	#4	#8	#50	#200	
% Passing	100	82.01	65.01	58.02	38.02	22.02	8.01	3.03	

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:-----

The Executive Engineer,
Highways Division,
Narowal.

Subject: **Testing of ABC Materials (Asphalt Plant) Coarse Aggregates**
Project: Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison,
Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1041/DB dated 10-06-2024.

Please find below the results for the tests conducted on the coarse aggregate samples provided to this laboratory on 03-07-2024 through your representative.

Sample # 1

1. Sieve Analysis (ASTM C-136)

Sieve Size	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	71.98	2.24	0	0

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

Specific Gravity (oven dried condition)	2.86
Specific Gravity (saturated surface dry condition)	2.87
Apparent Specific Gravity	2.90
Water Absorption (%)	0.46

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	992.5	1.18	0.85
	Total = 0.85%			

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

Grading Used	Los Angeles Abrasion Value (%)
B	15.67

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.)				
1	3/4	5.53	1.55	6.54	1.83
3/4	1/2	7.70	5.37	9.78	6.82
1/2	3/8	20.48	0.46	23.89	0.53
			Flakiness Index = 7.38%	Elongation Index = 9.18%	

Sample # 2

1. Sieve Analysis (ASTM C-136)

Sieve Size	3/4"	1/2"	3/8"	#4
%age Passing	100	56.73	10.62	0

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

Specific Gravity (oven dried condition)	2.85
Specific Gravity (saturated surface dry condition)	2.86
Apparent Specific Gravity	2.89
Water Absorption (%)	0.55

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	991.7	1.26	1.13
Total = 1.13%				

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.21

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.)				
3/4	1/2	8.26	3.58	8.59	3.72
1/2	3/8	9.29	4.28	10.83	4.99
3/8	1/4	9.19	0.98	10.28	1.09
Flakiness Index = 8.84%			Elongation Index = 9.80%		

Sample # 3

1. Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4
%age Passing	100	56.92

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

Specific Gravity (oven dried condition)	2.86
Specific Gravity (saturated surface dry condition)	2.88
Apparent Specific Gravity	2.91
Water Absorption (%)	0.50

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
#4	300.9	288.9	3.99	1.72
Total = 1.72%				

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

Grading Used	Los Angeles Abrasion Value (%)
C	16.41

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.)				
3/8	1/4	5.70	5.70	6.60	6.60
Flakiness Index = 5.70%			Elongation Index = 6.60%		

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Best Regards,

Director
Transportation Engineering Laboratory

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Ref.:-----

Date:-----

The Executive Engineer,
Highways Division,
Narowal.

Subject: **Testing of Sub-base Material New (Dina Quarry)**

(RD 1398+00 – 1546+00) & (RD 777+00 – 1095+00)

Project: Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison,
Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1049/DB dated 10-06-2024.

Please find below the results for the tests conducted on the coarse aggregate sample provided to this laboratory on 03-07-2024 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	89.39	54.05	23.85	1.01	0.19	0

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

Specific Gravity (oven dried condition)	2.68
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.74
Water Absorption (%)	0.79

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" + ¾"	1501.3	1484.3	1.13	0.74
	Total = 0.74%			

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

Grading Used	Los Angeles Abrasion Value (%)
A	25.65

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	1 ½	3.61	0.38	5.09	0.54
1 ½	1	6.89	2.43	8.62	3.04
1	¾	9.00	2.72	10.14	3.06
¾	½	10.64	2.43	11.09	2.53
½	⅜	0	0	43.89	0.36
⅜	¼	0	0	59.62	0.11
Flakiness Index = 7.96%			Elongation Index = 9.64%		

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Best Regards,

Director
Transportation Engineering Laboratory

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Ref.:-----

Date:-----

The Executive Engineer,
Highways Division,
Narowal.

Subject: **Testing of Water Bound Macadam**
(RD 1398+00 – 1546+00) & (RD 1778+00 – 1884+00) & (RD 777+00 – 1095+00)
Project: Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison,
Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1046/DB dated 10-06-2024.

Please find below the results for the tests conducted on the coarse aggregate sample provided to this laboratory on 03-07-2024 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	62.30	8.98	0.56	0	0	0	0	0

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

Specific Gravity (oven dried condition)	2.73
Specific Gravity (saturated surface dry condition)	2.75
Apparent Specific Gravity	2.78
Water Absorption (%)	0.68

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 1/2"	5009.3	4989.2	0.40	0.25
	Total = 0.25%			

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

Grading Used	Los Angeles Abrasion Value (%)
1	20.08

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	8.96	3.38	0	0
2 ½	2	15.51	8.27	11.59	6.18
2	1 ½	11.34	0.95	12.14	1.02
1 ½	1	6.00	0.03	12.58	0.07
Flakiness Index = 12.63%			Elongation Index = 7.27%		

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

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Director
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Ref.:-----

Date:-----

The Assistant Director (Tech)
Anti-Corruption Establishment,
Dera Ghazi Khan.

Subject: **Testing of Asphalt Concrete Sample**

Testing of Sample Collected During Site Visit in Connection with Enquiry Bearing
No. 368/24

Dear Sir,

It is with reference to your letter No. 122-ADT dated 06-07-2024.

Please find below the results for the tests conducted on the asphalt concrete sample
provided to this laboratory on 11-07-2024 through your representative.

BULK SPECIFIC GRAVITY OF COMPACTED ASPHALT (ASTM D2726):

Core	Mean Thickness (cm)	Mean Diameter (cm)	Bulk Specific Gravity
RD 742 + 00 (C/S)	6.800	10.610	2.392

BITUMEN EXTRACTION TEST:

<i>Bitumen Extraction Value (ASTM D-2172)</i>											3.58%
<i>Gradation Analysis</i>											
<i>Sieve No.</i>	1"	¾"	½"	3/8"	#4	#8	#16	#30	#50	#100	#200
<i>% Passing</i>	100	82.33	59.49	44.51	33.77	24.35	15.90	12.22	8.70	5.13	2.58

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

Ref.:-----

Date:-----

Mr. Muhammad Saqib Haider
Assistant Resident Engineer,
Package-III (PCP), Jhang.

Subject: **Testing of Bitumen**
Construction of New Disposal Station Zone – I in Jhang City PCP

Dear Sir,

It is with reference to your letter No. JHANG/NDZ-I/1095/35 dated 13-07-2024.
Please find below the results of tests conducted on the bitumen sample provided to this laboratory on 22-07-2024 through your representative.

Sr.#	Laboratory Tests	Results
1	Penetration (ASTM D-5)	96 Units
2	Ductility (ASTM D-113)	Above 100 cm
3	Softening Point (ASTM D-36)	46.5°C
4	Flash Point (ASTM D-92)	292°C
5	Fire Point (ASTM D-92)	320°C
6	Specific Gravity Value (ASTM D-70)	1.015
7	Loss on Heating Value (ASTM D-6)	0.234%

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

Ref.:-----

Date:-----

Mr. Muhammad Saqib Haider
Assistant Resident Engineer,
Package-III (PCP), Jhang.

Subject: **Testing of Sand**
Construction of New Disposal Station Zone – I in Jhang City PCP

Dear Sir,

It is with reference to your letter No. JHANG/NDZ-I/PKG03/35 dated 13-07-2024.
Please find below the results of tests conducted on the sand sample provided to this
laboratory on 25-07-2024 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	½”	3/8”	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.14	96.36	91.12	80.35	64.23	27.11	5.52	1.17

2. Specific Gravity & Water Absorption (ASTM C-128)

Specific Gravity (OD)	2.68
Specific Gravity (SSD)	2.70
Apparent Specific Gravity	2.73
Water Absorption (%)	0.70

3. Moisture Content (ASTM C-566)

Moisture Content (%)	13.88
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Ref.-----

Date:-----

Mr. Saquib Akram
Resident Engineer,
NESPAK,
Lahore.

Subject: **Testing of Water Bound Macadam Material**
Construction of Road from Natha Singh Pind to Leel Pind. Lahore

Dear Sir,

It is with reference to your letter No. 3772/103/LDA-Leel Pind/SA/04/03 dated 11-07-2024.

Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 25-07-2024 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	3"	2 ½"	2"	1 ½"
%age Passing	100	62.74	8.39	0

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

Grading Used	Los Angeles Abrasion Value (%)
1	20.04

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Ref.-----

Date:-----

Mr. Tanveer Ahmed
Lab. Manager,
Alpha Housing, Faisalabad.

Subject: **Testing of Bitumen**

Dear Sir,

It is with reference to your letter No. Nil dated 25-07-2024.

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)	65 Units
2	Softening Point (ASTM D-36)	48.6°C
3	Flash Point (ASTM D-92)	290°C
4	Fire Point (ASTM D-92)	327°C

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

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