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. Sohaib Awais
Resident Engineer,
NESPAK.

Subject: **Testing of Water Bound Macadam**
Infrastructure Development at Chahar Bagh Phase-II

Dear Sir,

It is with reference to your letter No. 4841/13/SA/05/46 dated 09-07-2025.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 21-07-2025 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	89.77	22.80	0.06	0	0	0	0	0

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

Specific Gravity (oven dried condition)	2.69
Specific Gravity (saturated surface dry condition)	2.71
Apparent Specific Gravity	2.73
Water Absorption (%)	0.59

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”	5010.4	4991.6	0.38	0.34
	Total = 0.34%			

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

Grading Used	**Los Angeles Abrasion Value (%)**
1	20.87

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	4.90	0.50	11.37	1.16
2 ½	2	5.03	3.37	10.00	6.70
2	1 ½	3.72	0.85	7.19	1.63
1 ½	1	0	0	0	0
		Flakiness Index = 4.72%		**Elongation Index = 9.49%**	

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

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

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

Ref.----------

Date:----------

Mr. Rashid Kamran
Resident Engineer,
NESPAK, Lahore.

Subject: **Testing of Asphalt Wearing Course** (Bitumen Extraction Test)
Improvement of Infrastructure in Mohlanwal Housing Scheme, Lahore (Package-1)

Dear Sir,

It is with reference to your letter No. 2599/13/RK/05/MWL/P-1/257A dated 15-07-2025. Please find below the results for the test conducted on asphalt concrete cores provided to this laboratory on 24-07-2025 through your representative.

BITUMEN EXTRACTION TEST:

Core # 1

Bitumen Extraction Value (ASTM D-2172)							**4.38%**
Gradation Analysis							
Sieve No.	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	71.92	59.50	42.41	26.55	9.69	4.25

Core # 2

Bitumen Extraction Value (ASTM D-2172)						**4.41%**
Gradation Analysis						
Sieve No.	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	72.42	59.94	42.96	27.19	10.43	4.61

Core # 3

Bitumen Extraction Value (ASTM D-2172)							**4.39%**
Gradation Analysis							
Sieve No.	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	70.36	58.18	40.79	24.79	7.59	3.16

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

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

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

Ref.---------- Date:----------

The Resident Engineer (GB Zone),
EPHE Division,
NESPAK, Lahore.

Subject: **Testing of Coarse Aggregate** (Source: Sargodha Crush)
Construction of Disposal at T. No. 05, UC-71, Gunj Baksh Zone, Lahore
M/s PACON International

Dear Sir,

It is with reference to your letter No. LDP/GB-WASA/43101-934 dated 08-07-2025.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 24-07-2025 through your representative.

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

Sieve Size	1”	¾”	½”	3/8”	#4
%age Passing	100	85.94	26.20	0.83	0

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

Specific Gravity (oven dried condition)	2.82
Specific Gravity (saturated surface dry condition)	2.83
Apparent Specific Gravity	2.85
Water Absorption (%)	0.36

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	994.6	0.97	0.83
	Total = 0.83%			

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

Grading Used	**Los Angeles Abrasion Value (%)**
B	15.80

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	$^3/_4$	0	0	0	0
$^3/_4$	$^1/_2$	8.33	4.98	10.82	6.46
$^1/_2$	$^3/_8$	8.76	2.22	12.94	3.28
$^3/_8$	$^1/_4$	0	0	35.66	0.30
		Flakiness Index = 7.20%		**Elongation Index = 10.04%**	

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

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

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

Ref.---------- Date:----------

The Assistant Resident Engineer,
16 City of Project,
Package # 1,
Jhelum.

Subject: **Testing of Material** (Base Course Material)
Project: Construction of SWM Parking Area in Jhelum City

Dear Sir,

It is with reference to your letter No. ARE/JHE-PS/MC-46 dated 04-08-2025.
Please find below the results for the test conducted on the aggregate sample provided to this laboratory through your representative.

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

Grading Used	Los Angeles Abrasion Value (%)
2	20.18

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

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

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

Ref.---------- Date:----------

Mr. Mohsin Adeel
Material Engineer,
NESPAK,
Samanabad Zone.

Subject: **Testing of Material** (Sub-base Material)
Improvement of Water Supply System/Sewerage System, UC-85 Samanabad Zone

Dear Sir,

It is with reference to your letter No. 4891/NESPAK/WASA/LDP1/UC-85 dated 12-07-2025. Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 28-07-2025 through your representative.

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

Sieve Size	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	98.21	81.14	62.27	48.68	39.86	33.24

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

Grading Used	**Los Angeles Abrasion Value (%)**
A	28.21

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

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

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

Ref.---------- Date:----------

The Executive Engineer,
Highway Division, Narowal.

Subject: **Testing of Construction Materials** (Water Bound Macadam)
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. 929/CB dated 29-07-2025.
Please find below the results for the tests conducted on the WBM samples provided to this laboratory through your representative.

Sample (RD 692+00)

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

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	78.05	15.47	0.34	0	0	0	0	0

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

Specific Gravity (oven dried condition)	2.67
Specific Gravity (saturated surface dry condition)	2.69
Apparent Specific Gravity	2.72
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.
2” + 1 ½”	5004.9	4982.9	0.44	0.34
	Total = 0.34%			

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

Grading Used	**Los Angeles Abrasion Value (%)**
1	20.18

Sample (RD 701+00)

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

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	78.03	14.95	0.29	0	0	0	0	0

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

Specific Gravity (oven dried condition)	2.64
Specific Gravity (saturated surface dry condition)	2.67
Apparent Specific Gravity	2.71
Water Absorption (%)	0.98

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”	5004.9	4976.9	0.56	0.44
	Total = 0.44%			

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

Grading Used	**Los Angeles Abrasion Value (%)**
1	24.01

Sample (RD 712+00)

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

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	82.41	14.66	0.2	0	0	0	0	0

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

Specific Gravity (oven dried condition)	2.71
Specific Gravity (saturated surface dry condition)	2.72
Apparent Specific Gravity	2.74
Water Absorption (%)	0.41

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"	5001.4	4981.4	0.40	0.33
	Total = 0.33%			

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

Grading Used	Los Angeles Abrasion Value (%)
1	19.46

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

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

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

Ref.---------- Date:----------

The Resident Engineer,
ESS-I-AAR Consultants.

Subject: **Testing of Coarse Aggregates**
Project: Construction of Flyover at Nadirabad Phatak to Industrial Estate, Multan, Group II
Construction of Flyover Bridge 3, Tehsil and District Multan

Dear Sir,

It is with reference to your letter No. 5330 dated 28-07-2025.
Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

Sample # 1 (19 mm)

Sieve Analysis (ASTM C-136)

Sieve Size	1”	¾”	½”	3/8”	#4
%age Passing	100	6.88	0.26	0	0

Sample # 2 (12 mm)

Sieve Analysis (ASTM C-136)

Sieve Size	1”	¾”	½”	3/8”	#4
%age Passing	100	95.04	0.42	0	0

Mixed Sample

1. **Specific Gravity & Water Absorption (ASTM C-127**

Specific Gravity (oven dried condition)	2.83
Specific Gravity (saturated surface dry condition)	2.84
Apparent Specific Gravity	2.85
Water Absorption (%)	0.32

2. 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.
$1/2" + 3/8"$	1002.4	990.8	1.14	0.80
	Total = 0.80%			

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.21

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

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

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

Ref.---------- Date:----------

The Assistant Executive Engineer,
Pakistan Railways,
Qila Sheikhupura.

Subject: **Testing of Crushed Stone Samples**

Supply, Stacking & Loading into Railway Wagons 2" Normal Size Mechanically Crushed Stone Ballast from Nishtarabad Quarry Approved by Pakistan Railways by Road Vehicle, Dumper Truck or Any Other Means According to Revised Railway Specifications Including All Charges Such as Royality, Lead. Lift, Handling, Re-handling, Screening, Sales Tax and Other Incidental Charges and Stacking at Chichoki Mallian Railway Station Yard (Lahore Division) (4,00,000) (Complete in All Respect)

Dear Sir,

It is with reference to your letter No. W/1-Misc/QSP dated 11-09-2025.
Please find below the results for the tests conducted on the crushed stone samples provided to this laboratory through your representative.

Sample # 1

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

Sieve Size	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	37.91	8.95	0.49	0	0	0	0

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

Specific Gravity (oven dried condition)	2.69
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.73
Water Absorption (%)	0.44

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"	5004.3	4978.1	0.52	0.47
	Total = 0.47%			

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

Grading Used	Los Angeles Abrasion Value (%)
2	25.10

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	6.04	3.75	9.96	6.18
2	1 ½	17.04	4.94	24.20	7.01
1 ½	1	11.59	0.98	17.26	1.46
1	¾	0	0	0	0
		Flakiness Index = 9.67%		**Elongation Index = 14.65%**	

Sample # 2

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

Sieve Size	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	46.43	9.47	0.95	0	0	0	0

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

Specific Gravity (oven dried condition)	2.68
Specific Gravity (saturated surface dry condition)	2.69
Apparent Specific Gravity	2.72
Water Absorption (%)	0.58

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"	5004.7	4984.9	0.40	0.36
	Total = 0.36%			

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

Grading Used	Los Angeles Abrasion Value (%)
2	25.47

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	8.00	4.29	14.52	7.78
2	1 ½	9.16	3.39	13.17	4.87
1 ½	1	7.48	0.64	10.65	0.91
1	¾	5.71	0.05	17.68	0.17
		Flakiness Index = 8.37%		**Elongation Index = 13.73%**	

Sample # 3

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

Sieve Size	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	42.18	9.31	0.64	0	0	0	0

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

Specific Gravity (oven dried condition)	2.69
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.72
Water Absorption (%)	0.47

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"	5002.7	4980.8	0.44	0.40
	Total = 0.40%			

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

Grading Used	Los Angeles Abrasion Value (%)
2	25.41

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.)				
2 ½	2	9.79	5.66	13.51	7.81
2	1 ½	10.30	3.39	15.43	5.07
1 ½	1	12.82	1.11	15.49	1.34
1	¾	11.15	0.07	22.94	0.15
		Flakiness Index = 10.23%		**Elongation Index = 14.37%**	

Sample # 4

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

Sieve Size	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	36.59	8.57	0.65	0	0	0	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	2.73
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.
2" + 1 ½"	5003.4	4983.4	0.40	0.37
	Total = 0.37%			

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

Grading Used	Los Angeles Abrasion Value (%)
2	25.28

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	11.41	7.23	16.58	10.51
2	1 ½	14.55	4.08	17.62	4.94
1 ½	1	11.00	0.87	11.75	0.93
1	¾	8.97	0.06	23.70	0.15
		Flakiness Index = 12.24%		**Elongation Index = 16.53%**	

Sample # 5

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

Sieve Size	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	45.98	8.44	0.94	0	0	0	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 (%)	0.78

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"	5000.9	4978.9	0.44	0.40
	Total = 0.40%			

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

Grading Used	Los Angeles Abrasion Value (%)
2	25.63

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	12.24	6.61	13.80	7.45
2	1 ½	11.79	4.43	15.22	5.71
1 ½	1	12.49	0.94	15.47	1.16
1	¾	14.10	0.13	0	0
		Flakiness Index = 12.11%		**Elongation Index = 14.32%**	

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
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Transportation Engineering Laboratory (TEL)

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UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE – 54890 (PAKISTAN)

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

Ref.---------- Date:----------

The Sub Divisional Officer,
Highway Sub Division,
Sohawa.

Subject: **Testing of Bitumen – AASHTO Standard (M-20)**
Restoration/Improvement of Road from Peer Phalhi Chowk to Bulbul Khurd, Length = 2.00 km, Tehsil Sohawa, District Jhelum

Dear Sir,

It is with reference to your letter No. 114/S dated 03-04-2025.
Please find below the results of tests conducted on the bitumen sample provided to this laboratory on 16-09-2025 through your representative.

Sr.#	Laboratory Tests	Results
1	Penetration (ASTM D-5)	87 Units
2	Penetration of Residue (ASTM D-5)	80 Units
3	Ductility (ASTM D-113)	Above 100 cm
4	Ductility of Residue (ASTM D-113)	Above 100 cm
5	Softening Point (ASTM D-36)	45.0°C
6	Flash Point (ASTM D-92)	290°C
7	Fire Point (ASTM D-92)	320°C
8	Solubility (ASTM D-2042)	99.80%
9	Specific Gravity Value (ASTM D-70)	1.036
10	Thin Film Oven Test Value (ASTM D-1754)	0.475%
11	Loss on Heating Value (ASTM D-6)	0.437%

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

Best Regards,

Director
Transportation Engineering Laboratory

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