APPENDIX A – QUESTIONAIRE RESULTS

1. Date:	**8/18/98**		
2. County:	**BUNCOMBE**		
3. Location of asphalt mix plant:	**ENKA,NORTH CAROLINA**		
4. Type of plant:	**Please shade one**	**Batch Plant**	**Drum Mixer**
5. Plant brand name:	**GENCORE**		
6. Types of mixes produced by plant:	**BASE/BINDER/SURFACE**		
7. Source(s) of aggregates used by plant:	**VULCAN** **ENKA,NC**		
8. Type and source(s) of asphalt cement used:	**PG 64-22** **SOUTHERN STATES-KNOXVILLE,TN**		
9. Mixing and lay down temperature:	**MIX (310 F) LAYDOWN (290 F)**		
10. Type and source of tack coat used:	**SECO CRS 2.5** **COLUMBIA, S.C.**		
11. Type of dust collector used:	**GENCORE BAG HOUSE**		
12. How is dust introduced into the mix:	**AUGERED INTO MIXING RING**		
13. Are all bag house fines used in mix or is part wasted:	**ALL ARE USED**		
14. Is RAP used and percentage:	**YES** **15%**		
15. Rated capacity of plant (tons/day):	**300 TONS/HOUR**		
16. Attach all current NCDOT approved Job Mix Formula:			

1. Date:	**8/18/98**		
2. County:	**BUNCOMBE**		
3. Location of asphalt mix plant:	**SWANNANOA,NORTH CAROLINA**		
4. Type of plant:	**Please shade one**	**Batch Plant**	**Drum Mixer**
5. Plant brand name:	**McCARTER**		
6. Types of mixes produced by plant:	**BASE/BINDER/SURFACE**		
7. Source(s) of aggregates used by plant:	**GROVESTONE** **SWANNANOA,NC**		
8. Type and source(s) of asphalt cement used:	**PG 64-22** **SOUTHERN STATES-KNOXVILLE,TN**		
9. Mixing and lay down temperature:	**MIX (310 F) LAYDOWN (290 F)**		
10. Type and source of tack coat used:	**SECO CRS 2.5** **COLUMBIA, S.C.**		
11. Type of dust collector used:	**ESSTEE BAG HOUSE**		
12. How is dust introduced into the mix:	**AUGERED INTO HOT ELEVATOR**		
13. Are all bag house fines used in mix or is part wasted:	**ALL ARE USED**		
14. Is RAP used and percentage:	**YES** **15%**		
15. Rated capacity of plant (tons/day):	**5 TON BATCH**		
16. Attach all current NCDOT approved Job Mix Formula:			

1. Date:	**8/18/98**		
2. County:	**BUNCOMBE**		
3. Location of asphalt mix plant:	**WEAVERVILLE,NORTH CAROLINA**		
4. Type of plant: CONSTA FLOW	**Please shade one**	**Batch Plant**	**Drum Mixer**
5. Plant brand name:	**APAC-CONSTA FLOW**		
6. Types of mixes produced by plant:	**BASE/BINDER/SURFACE**		
7. Source(s) of aggregates used by plant:	**B V HEDRICK** **NORTH BUNCOMBE QUARRY**		
8. Type and source(s) of asphalt cement used:	**PG 64-22** **SOUTHERN STATES-KNOXVILLE,TN**		
9. Mixing and lay down temperature:	**MIX (310 F) LAYDOWN (290 F)**		
10. Type and source of tack coat used:	**SECO CRS 2.5** **COLUMBIA, S.C.**		
11. Type of dust collector used:	**ESSTEE BAG HOUSE**		
12. How is dust introduced into the mix:	**AUGERED INTO MIXER**		
13. Are all bag house fines used in mix or is part wasted:	**ALL ARE USED**		
14. Is RAP used and percentage:	**YES** **15%**		
15. Rated capacity of plant (tons/day):	**240 TONS/HOUR**		
16. Attach all current NCDOT approved Job Mix Formula:			

1. Date:	**8/18/98**		
2. County:	**BURKE**		
3. Location of asphalt mix plant:	**MORGANTON,NORTH CAROLINA**		
4. Type of plant:	**Please shade one**	**Batch Plant**	**Drum Mixer**
5. Plant brand name:	**BARBER-GREEN**		
6. Types of mixes produced by plant:	**BASE/BINDER/SURFACE**		
7. Source(s) of aggregates used by plant:	**VULCAN-MORGANTON**		
8. Type and source(s) of asphalt cement used:	**PG 64-22** **INMAN ASPHALT-INMAN,S.C.**		
9. Mixing and lay down temperature:	**MIX (310 F) LAYDOWN (290 F)**		
10. Type and source of tack coat used:	**SECO CRS 2.5** **COLUMBIA, S.C.**		
11. Type of dust collector used:	**ESSTEE BAG HOUSE**		
12. How is dust introduced into the mix:	**AUGERED INTO HOT ELEVATOR**		
13. Are all bag house fines used in mix or is part wasted:	**ALL ARE USED**		
14. Is RAP used and percentage:	**NO**		
15. Rated capacity of plant (tons/day):	**3 TON BATCH**		
16. Attach all current NCDOT approved Job Mix Formula:			

1. Date:	**8/18/98**		
2. County:	**RUTHERFORD**		
3. Location of asphalt mix plant:	**RUTHERFORDTON,NORTH CAROLINA**		
4. Type of plant:	**Please shade one**	**Batch Plant**	**Drum Mixer**
5. Plant brand name:	**ASTEC**		
6. Types of mixes produced by plant:	**BASE/BINDER/SURFACE**		
7. Source(s) of aggregates used by plant:	**MILLER CREEK QUARRY**		
8. Type and source(s) of asphalt cement used:	**PG 64-22** **INMAN ASPHALT-INMAN,SC**		
9. Mixing and lay down temperature:	**MIX (310 F) LAYDOWN (290 F)**		
10. Type and source of tack coat used:	**PG 64-22** **INMAN ASPHALT-INMAN,SC**		
11. Type of dust collector used:	**BAG HOUSE-ASTEC**		
12. How is dust introduced into the mix:	**BY AUGER**		
13. Are all bag house fines used in mix or is part wasted:	**ALL ARE USED**		
14. Is RAP used and percentage:	**NO**		
15. Rated capacity of plant (tons/day):	**250 TON/HOUR**		
16. Attach all current NCDOT approved Job Mix Formula:			

1. Date:	**8/18/98**		
2. County:	**YANCEY**		
3. Location of asphalt mix plant:	**BURNSVILLE,NORTH CAROLINA**		
4. Type of plant:	**Please shade one**	**Batch Plant**	**Drum Mixer**
5. Plant brand name:	**BARBER-GREEN**		
6. Types of mixes produced by plant:	**BASE/BINDER/SURFACE**		
7. Source(s) of aggregates used by plant:	**YANCEY STONE/VULCAN-ENKA**		
8. Type and source(s) of asphalt cement used:	**PG 64-22** **SOUTHERN STATES-KNOXVILLE,TN**		
9. Mixing and lay down temperature:	**MIX (310 F) LAYDOWN (290 F)**		
10. Type and source of tack coat used:	**SECO CRS 2.5** **COLUMBIA, S.C.**		
11. Type of dust collector used:	**ESSTEE BAG HOUSE**		
12. How is dust introduced into the mix:	**AUGERED INTO HOT ELEVATOR**		
13. Are all bag house fines used in mix or is part wasted:	**ALL ARE USED**		
14. Is RAP used and percentage:	**NO**		
15. Rated capacity of plant (tons/day):	**3 TON BATCH**		
16. Attach all current NCDOT approved Job Mix Formula:			

APPENDIX B – JOB MIX FORMULA (JMF'S)

99410 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RALEIGH, NORTH CAROLINA 27611

HOT MIX ASPHALT JOB MIX FORMULA

APAC-CAROLINA, INC

ENKA, NC

TYPE MIX: BCSC, TYPE HDS

JOB MIX FORM NO: 93-447-052

EFFECTIVE DATE: 07-27-93

PLANT CERTIFICATION NO: DM-310

PROJECT NO:

COUNTY: BUNCOMBE

AGGREGATE SOURCES AND BLEND PERCENTAGES

SUPPLIER	LOCATION/SOURCE	MATERIAL	BLEND(%)
VULCAN MATERIALS	ENKA QUARRY	#78M	42
VULCAN MATERIALS	ENKA QUARRY	W.SCRGS.	30
VULCAN MATERIALS	ENKA QUARRY	D.SCRGS.	28

TOTAL: 100.0%

JMF COMBINED GRADATION

SIEVE SIZE	% PASSING
2''	
1 ½ ''	
1''	
¾''	100
½''	98
3/8''	95
NO. 4	72
8	50
16	39
40	24
80	12
200	5.0

ASPHALT CEMENT %(TOT) 5.7

GRADE		PG64-22
EST ASH	11-3-93	0.3
MAX. SP. GV.		2.486
LABORATORY SP. GV.		2.364
VOIDS IN TOTAL MIX %		4.9
MIN. % COMPACTION		95.0
MIX TEMPERATURE F.		285
FLOW (0.01 IN.)		11
STABILITY (LBS.)		3000
NON STRIP ADDITIVE %		0.50
MODIFIER %		0.00

ASPHALT CEMENT SUPPLIER : SPECS.
TACK COAT SUPPLIER : SPECS.
NON-STRIP ADD. SUPPLIER : PAVE BOND LP – CINCINNATI, OHIO
MODIFIER SUPPLIER :

COMMENTS:

% AC DECREASED TO INCREASE VOIDS. BLEND CHANGES TO CONTROL GRADATION & VOIDS IN MIX. #8 SIEVE CHANGE BASED ON FIELD TEST RESULTS.

DATE JMF VOID:

APPROVED BY:
J.E. GRADY, JR.
PAVEMENT CONSTRUCTION ENGR.

99410 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RALEIGH, NORTH CAROLINA 27611

HOT MIX ASPHALT JOB MIX FORMULA

THOMPSON CONTRACTORS, INC

RUTHERFORDTON, NC

PLANT CERTIFICATION NO: DM-286

TYPE MIX: BCSC, TYPE HDS

JOB MIX FORM NO: 93-903-051

EFFECTIVE DATE: 02-07-94

PROJECT NO:

COUNTY: RUTHERFORD

AGGREGATE SOURCES AND BLEND PERCENTAGES

SUPPLIER	LOCATION/SOURCE	MATERIAL	BLEND(%)
THOMPSON CONTRACTORS	MILLER CREEK QUARRY	#78M	47
THOMPSON CONTRACTORS	MILLER CREEK QUARRY	SCRGS.	33
THOMPSON CONTRACTORS	BROAD RIVER	SAND	20

TOTAL: 100.0%

JMF COMBINED GRADATION

SIEVE SIZE	% PASSING
2''	
1 ½ ''	
1''	
¾''	100
½''	98
3/8''	95
NO. 4	69
8	53
16	43
40	24
80	11
200	5.9

ASPHALT CEMENT %(TOT) 6.2

GRADE		PG64-22
EST ASH	11-3-93	0.4
MAX. SP. GV.		2.502
LABORATORY SP. GV.		2.378
VOIDS IN TOTAL MIX %		5.0
MIN. % COMPACTION		95.0
MIX TEMPERATURE F.		285
FLOW (0.01 IN.)		9
STABILITY (LBS.)		1900
NON STRIP ADDITIVE %		0.50
MODIFIER %		0.00

ASPHALT CEMENT SUPPLIER : SPECS.
TACK COAT SUPPLIER : SPECS.
NON-STRIP ADD. SUPPLIER : PERMA-TAC — SCAN ROAD
MODIFIER SUPPLIER :

COMMENTS:

DATE JMF VOID:

APPROVED BY:
J.E. GRADY, JR.
PAVEMENT CONSTRUCTION ENGR.

APPENDIX C – SHRPBIND PROGRAM OUTPUT

SHRP SUPERPAVE BINDER SELECTION PROGRAM
SHRPBIND VERSION 2.0, MAY 1995

----------GENERAL INFORMATION----------	
State	NC
County	BUNCOMBE
Weather Station	ASHEVILLE
Longtitude	82.53
Latitude	35.6
Elevation	683
Years of Climatic Data	43
Depth to Layer Surface	33 mm

----------Low Air Temperature----------	
Lowest Low Temp., Degree C	-27
Median of annual Low Temps	-16
Mean of annual Low Temps	-16
Low Temp. Standard Deviation	3.9

----------High Air Temperature----------	
Highest Mean 7-day recorded	35
Median of Mean 7-day Temps	32
Mean of Mean 7-day Temps	32
High Temp. Standard Deviation	3.9
N-Design Temperature	32

----------50% Reliability ----------	
50% Reliability High Pvt Temp.	48.9
50% Reliability Low Pvt Temp.	-16
Performance Grade, >50% Reliab.	52-16
PG Actual Reliab. (High, Low)	(98, 66)

----------98% Reliability ----------	
98% Reliability High Pvt Temp.	50.9
98% Reliability Low Pvt Temp.	-22.4
Performance Grade, >98% Reliab.	52-28
PG Actual Reliab. (High, Low)	(98,98)

----------PG Versus Reliability----------	
PG (High, Low Reliability)	52-16 (98, 66)
PG (High, Low Reliability)	52-22 (98, 97)
PG (High, Low Reliability)	52-28 (98, 98)

SHRP SUPERPAVE BINDER SELECTION PROGRAM
SHRPBIND VERSION 2.0, MAY 1995

----------GENERAL INFORMATION----------	
State	NC
County	RUTHERFORD
Weather Station	CAROLEEN
Longtitude	81.8
Latitude	35.28
Elevation	247
Years of Climatic Data	69
Depth to Layer Surface	32 mm

----------Low Air Temperature----------	
Lowest Low Temp., Degree C	-22
Median of annual Low Temps	-12
Mean of annual Low Temps	-13
Low Temp. Standard Deviation	3.3

----------High Air Temperature----------	
Highest Mean 7-day recorded	39
Median of Mean 7-day Temps	36
Mean of Mean 7-day Temps	36
High Temp. Standard Deviation	3.3
N-Design Temperature	36

----------50% Reliability ----------	
50% Reliability High Pvt Temp.	52.6
50% Reliability Low Pvt Temp.	-13
Performance Grade, >50% Reliab.	58-16
PG Actual Reliab. (High, Low)	(98, 91)

----------98% Reliability ----------	
98% Reliability High Pvt Temp.	55.8
98% Reliability Low Pvt Temp.	-18.3
Performance Grade, >98% Reliab.	58-22
PG Actual Reliab. (High, Low)	(98, 98)

----------PG Versus Reliability----------	
PG (High, Low Reliability)	58-16 (98, 91)
PG (High, Low Reliability)	58-22 (98, 98)

APPENDIX D – DSR TEST RESULTS

Table D.1 |G*| and δ values for binders at 58° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	2.13E+01	8.94E+01	5.55E+01	8.93E+01	1.58E+01	8.91E+01	4.79E+01	8.93E+01
5.00E-02	1.06E+02	8.93E+01	2.74E+02	8.82E+01	7.84E+01	8.95E+01	2.35E+02	8.81E+01
1.00E-01	2.12E+02	8.90E+01	5.41E+02	8.72E+01	1.57E+02	8.91E+01	4.63E+02	8.71E+01
1.50E-01	3.16E+02	8.89E+01	8.03E+02	8.65E+01	2.34E+02	8.89E+01	6.86E+02	8.65E+01
5.00E-01	1.03E+03	8.76E+01	2.52E+03	8.42E+01	7.68E+02	8.77E+01	2.15E+03	8.41E+01
1.00E+00	2.00E+03	8.65E+01	4.80E+03	8.28E+01	1.50E+03	8.68E+01	4.10E+03	8.26E+01
1.59E+00	3.11E+03	8.58E+01	7.46E+03	8.16E+01	2.36E+03	8.61E+01	6.35E+03	8.16E+01
5.00E+00	9.22E+03	8.38E+01	2.04E+04	7.87E+01	6.96E+03	8.41E+01	1.73E+04	7.88E+01
1.00E+01	1.75E+04	8.23E+01	3.72E+04	7.69E+01	1.33E+04	8.26E+01	3.17E+04	7.71E+01
2.00E+01	3.30E+04	8.03E+01	6.70E+04	7.49E+01	2.49E+04	8.06E+01	5.64E+04	7.51E+01

Table D.2 |G*| and δ values for binders at 64° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	9.10E+00	8.78E+01	2.28E+01	8.97E+01	6.96E+00	8.92E+01	1.94E+01	8.94E+01
5.00E-02	4.49E+01	8.93E+01	1.14E+02	8.92E+01	3.39E+01	8.94E+01	9.63E+01	8.91E+01
1.00E-01	9.00E+01	8.94E+01	2.26E+02	8.86E+01	6.78E+01	8.95E+01	1.93E+02	8.85E+01
1.50E-01	1.35E+02	8.92E+01	3.38E+02	8.82E+01	1.02E+02	8.93E+01	2.88E+02	8.80E+01
5.00E-01	4.46E+02	8.85E+01	1.09E+03	8.62E+01	3.35E+02	8.86E+01	9.27E+02	8.61E+01
1.00E+00	8.81E+02	8.78E+01	2.10E+03	8.50E+01	6.64E+02	8.80E+01	1.79E+03	8.49E+01
1.59E+00	1.35E+03	8.71E+01	3.29E+03	8.40E+01	1.05E+03	8.73E+01	2.77E+03	8.38E+01
5.00E+00	4.18E+03	8.53E+01	9.31E+03	8.14E+01	3.15E+03	8.53E+01	7.92E+03	8.13E+01
1.00E+01	8.02E+03	8.37E+01	1.74E+04	7.96E+01	6.08E+03	8.36E+01	1.48E+04	7.96E+01
2.00E+01	1.53E+04	8.15E+01	3.15E+04	7.74E+01	1.16E+04	8.08E+01	2.70E+04	7.77E+01

Table D.3 |G*| and δ values for binders at 70° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	4.24E+00	8.85E+01	9.56E+00	8.93E+01	3.29E+00	8.89E+01	8.25E+00	8.94E+01
5.00E-02	2.05E+01	8.90E+01	4.72E+01	8.95E+01	1.65E+01	8.93E+01	4.02E+01	8.96E+01
1.00E-01	4.10E+01	8.92E+01	9.46E+01	8.93E+01	3.29E+01	8.95E+01	8.12E+01	8.93E+01
1.50E-01	6.17E+01	8.93E+01	1.41E+02	8.90E+01	4.95E+01	8.94E+01	1.21E+02	8.90E+01
5.00E-01	2.05E+02	8.90E+01	4.65E+02	8.77E+01	1.64E+02	8.91E+01	3.99E+02	8.77E+01
1.00E+00	4.09E+02	8.86E+01	9.13E+02	8.67E+01	3.28E+02	8.87E+01	7.82E+02	8.66E+01
1.59E+00	6.33E+02	8.80E+01	1.44E+03	8.57E+01	5.15E+02	8.82E+01	1.22E+03	8.57E+01
5.00E+00	1.98E+03	8.61E+01	4.20E+03	8.33E+01	1.58E+03	8.62E+01	3.59E+03	8.31E+01
1.00E+01	3.86E+03	8.43E+01	7.94E+03	8.14E+01	3.09E+03	8.45E+01	6.80E+03	8.11E+01
2.00E+01	7.49E+03	8.14E+01	1.48E+04	7.87E+01	5.94E+03	8.11E+01	1.27E+04	7.83E+01

Table D.4 |G*| and δ values for baghouse mastics at 58° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	2.59E+02	7.95E+01	3.74E+02	8.26E+01	1.63E+02	8.13E+01	1.62E+02	8.20E+01
5.00E-02	1.05E+03	8.37E+01	1.57E+03	8.57E+01	6.14E+02	8.77E+01	5.95E+02	8.78E+01
1.00E-01	1.99E+03	8.51E+01	2.92E+03	8.64E+01	1.20E+03	8.77E+01	1.17E+03	8.78E+01
1.50E-01	2.87E+03	8.56E+01	4.29E+03	8.64E+01	1.80E+03	8.75E+01	1.75E+03	8.76E+01
5.00E-01	8.88E+03	8.64E+01	1.33E+04	8.58E+01	5.77E+03	8.61E+01	5.51E+03	8.56E+01
1.00E+00	1.70E+04	8.66E+01	2.52E+04	8.53E+01	1.13E+04	8.44E+01	1.07E+04	8.38E+01
1.59E+00	2.75E+04	8.66E+01	4.07E+04	8.47E+01	1.71E+04	8.29E+01	1.68E+04	8.26E+01
5.00E+00	7.47E+04	8.93E+01	1.08E+05	8.65E+01	5.11E+04	7.58E+01	4.89E+04	7.47E+01
1.00E+01	1.38E+05	8.28E+01	1.97E+05	8.84E+01	9.99E+04	6.68E+01	9.61E+04	6.48E+01
2.00E+01	**	**	3.71E+05	7.82E+01	2.09E+05	5.33E+01	2.03E+05	5.24E+01

Table D.5 |G*| and δ values for baghouse mastics at 64° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	1.19E+02	7.69E+01	1.35E+02	8.30E+01	8.68E+01	7.80E+01	8.08E+01	7.81E+01
5.00E-02	4.41E+02	8.03E+01	5.95E+02	8.62E+01	2.72E+02	8.65E+01	2.64E+02	8.69E+01
1.00E-01	8.19E+02	8.22E+01	1.18E+03	8.67E+01	5.16E+02	8.78E+01	4.99E+02	8.78E+01
1.50E-01	1.21E+03	8.38E+01	1.75E+03	8.72E+01	7.65E+02	8.77E+01	7.43E+02	8.76E+01
5.00E-01	3.67E+03	8.68E+01	5.53E+03	8.79E+01	2.48E+03	8.61E+01	2.42E+03	8.59E+01
1.00E+00	6.67E+03	8.92E+01	1.05E+04	8.84E+01	4.86E+03	8.35E+01	4.74E+03	8.37E+01
1.59E+00	1.05E+04	8.73E+01	1.68E+04	8.91E+01	7.59E+03	8.16E+01	7.45E+03	8.13E+01
5.00E+00	3.16E+04	7.43E+01	4.78E+04	8.34E+01	2.40E+04	7.10E+01	2.31E+04	7.08E+01
1.00E+01	6.65E+04	5.77E+01	9.27E+04	7.22E+01	5.20E+04	5.43E+01	4.94E+04	5.48E+01
2.00E+01	1.79E+05	3.56E+01	2.00E+05	5.34E+01	1.29E+05	3.89E+01	1.27E+05	3.67E+01

Table D.6 |G*| and δ values for baghouse mastics at 70° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	5.58E+01	7.27E+01	1.02E+02	7.22E+01	4.33E+01	7.30E+01	4.42E+01	7.23E+01
5.00E-02	1.75E+02	7.91E+01	3.62E+02	7.75E+01	1.36E+02	8.28E+01	1.30E+02	8.43E+01
1.00E-01	3.15E+02	8.11E+01	6.55E+02	7.93E+01	2.31E+02	8.66E+01	2.25E+02	8.68E+01
1.50E-01	4.67E+02	8.28E+01	1.00E+03	8.13E+01	3.38E+02	8.71E+01	3.28E+02	8.70E+01
5.00E-01	1.47E+03	8.82E+01	2.75E+03	8.52E+01	1.10E+03	8.49E+01	1.07E+03	8.45E+01
1.00E+00	2.78E+03	8.57E+01	4.74E+03	8.83E+01	2.20E+03	8.08E+01	2.12E+03	8.08E+01
1.59E+00	5.23E+03	8.23E+01	8.13E+03	8.72E+01	3.31E+03	7.66E+01	3.22E+03	7.73E+01
5.00E+00	1.57E+04	5.25E+01	2.29E+04	6.84E+01	1.25E+04	5.37E+01	1.17E+04	6.05E+01
1.00E+01	4.72E+04	3.06E+01	5.37E+04	4.91E+01	3.38E+04	3.39E+01	2.98E+04	4.23E+01
2.00E+01	1.39E+05	1.80E+01	1.76E+05	2.54E+01	1.13E+05	1.84E+01	1.06E+05	1.93E+01

** Values discarded

Table D.7 |G*| and δ values for P#200 mastics at 58° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	1.79E+02	7.95E+01	2.81E+02	8.04E+01	4.26E+03	8.43E+01	1.14E+02	8.63E+01
5.00E-02	6.28E+02	8.68E+01	9.57E+02	8.69E+01	5.96E+04	8.82E+01	5.03E+02	8.85E+01
1.00E-01	1.23E+03	8.74E+01	1.86E+03	8.68E+01	1.72E+04	8.82E+01	9.88E+02	8.78E+01
1.50E-01	1.83E+03	8.73E+01	2.75E+03	8.66E+01	1.00E+03	8.76E+01	1.46E+03	8.74E+01
5.00E-01	5.88E+03	8.62E+01	8.70E+03	8.52E+01	3.23E+03	8.58E+01	4.67E+03	8.54E+01
1.00E+00	1.15E+04	8.47E+01	1.69E+04	8.38E+01	6.36E+03	8.41E+01	9.03E+03	8.34E+01
1.59E+00	1.76E+04	8.35E+01	2.64E+04	8.25E+01	1.01E+06	7.85E+01	1.43E+04	8.23E+01
5.00E+00	5.32E+04	7.72E+01	7.47E+04	7.66E+01	3.02E+04	7.34E+01	4.15E+04	7.27E+01
1.00E+01	1.03E+05	6.82E+01	1.41E+05	7.00E+01	2.06E+07	5.11E+01	8.23E+04	6.65E+01
2.00E+01	2.13E+05	5.58E+01	2.81E+05	5.88E+01	8.87E+07	3.47E+01	1.87E+05	4.67E+01

Table D.8 |G*| and δ values for P#200 mastics at 64° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	9.04E+01	7.59E+01	1.35E+02	7.83E+01	3.73E+01	8.14E+01	5.87E+01	8.35E+01
5.00E-02	2.82E+02	8.60E+01	4.26E+02	8.65E+01	1.46E+02	8.66E+01	2.31E+02	8.81E+01
1.00E-01	5.29E+02	8.74E+01	8.18E+02	8.72E+01	2.81E+02	8.79E+01	4.44E+02	8.82E+01
1.50E-01	7.82E+02	8.73E+01	1.21E+03	8.71E+01	4.20E+02	8.77E+01	6.60E+02	8.80E+01
5.00E-01	2.53E+03	8.61E+01	3.92E+03	8.59E+01	1.37E+03	8.54E+01	2.15E+03	8.56E+01
1.00E+00	5.01E+03	8.42E+01	7.66E+03	8.44E+01	2.76E+03	8.25E+01	4.16E+03	8.25E+01
1.59E+00	7.78E+03	8.19E+01	1.20E+04	8.30E+01	4.17E+03	7.96E+01	6.75E+03	8.19E+01
5.00E+00	2.45E+04	6.96E+01	3.55E+04	7.47E+01	1.44E+04	6.17E+01	2.07E+04	7.13E+01
1.00E+01	5.32E+04	5.47E+01	7.02E+04	6.31E+01	3.59E+04	4.19E+01	4.61E+04	5.15E+01
2.00E+01	1.41E+05	3.64E+01	1.47E+05	5.45E+01	1.15E+05	2.22E+01	1.21E+05	3.37E+01

Table D.9 |G*| and δ values for P#200 mastics at 70° C

Frequency (Hz)	Buncombe County				Rutherford County			
	Virgin		Aged		Virgin		Aged	
	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)	|G*| (Pa)	δ (deg)
1.00E-02	4.82E+01	7.01E+01	6.44E+01	7.39E+01	2.09E+01	8.23E+01	3.56E+01	8.23E+01
5.00E-02	1.46E+02	8.24E+01	2.08E+02	8.44E+01	7.33E+01	8.54E+01	1.29E+02	8.77E+01
1.00E-01	2.49E+02	8.63E+01	3.76E+02	8.68E+01	1.27E+02	8.72E+01	2.47E+02	8.82E+01
1.50E-01	3.62E+02	8.66E+01	5.57E+02	8.70E+01	1.85E+02	8.70E+01	3.61E+02	8.80E+01
5.00E-01	1.18E+03	8.49E+01	1.79E+03	8.54E+01	6.13E+02	8.27E+01	1.18E+03	8.50E+01
1.00E+00	2.36E+03	8.24E+01	3.57E+03	8.31E+01	1.25E+03	7.64E+01	2.36E+03	8.12E+01
1.59E+00	3.72E+03	8.19E+01	5.60E+03	7.98E+01	1.51E+03	6.78E+01	3.59E+03	7.61E+01
5.00E+00	1.25E+04	6.29E+01	1.79E+04	6.37E+01	8.29E+03	4.53E+01	1.31E+04	5.58E+01
1.00E+01	3.53E+04	3.50E+01	4.16E+04	4.71E+01	2.92E+04	2.18E+01	3.11E+04	4.17E+01
2.00E+01	1.13E+05	2.00E+01	1.29E+05	2.30E+01	1.00E+05	1.14E+01	1.02E+05	2.18E+01

Table D.10 |G*|sin δ values for Buncombe County materials, 58° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	2.13E+01	5.55E+01	2.54E+02	3.71E+02	1.76E+02	2.77E+02
5.00E-02	1.06E+02	2.74E+02	1.05E+03	1.56E+03	6.27E+02	9.56E+02
1.00E-01	2.12E+02	5.41E+02	1.98E+03	2.92E+03	1.22E+03	1.86E+03
1.50E-01	3.16E+02	8.01E+02	2.86E+03	4.28E+03	1.83E+03	2.74E+03
5.00E-01	1.03E+03	2.51E+03	8.86E+03	1.33E+04	5.86E+03	8.67E+03
1.00E+00	2.00E+03	4.76E+03	1.69E+04	2.51E+04	1.14E+04	1.68E+04
1.59E+00	3.10E+03	7.38E+03	2.75E+04	4.05E+04	1.75E+04	2.62E+04
5.00E+00	9.17E+03	2.00E+04	7.47E+04	1.08E+05	5.19E+04	7.26E+04
1.00E+01	1.74E+04	3.62E+04	1.37E+05	1.97E+05	9.60E+04	1.33E+05
2.00E+01	3.25E+04	6.47E+04	**	3.63E+05	1.76E+05	2.40E+05
Average	**6.58E+03**	**1.37E+04**	**3.01E+04**	**7.56E+04**	**3.63E+04**	**5.03E+04**

Table D.11 |G*|sin δ values for Buncombe County materials, 64° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	9.10E+00	2.28E+01	1.16E+02	1.34E+02	8.77E+01	1.33E+02
5.00E-02	4.49E+01	1.14E+02	4.34E+02	5.94E+02	2.81E+02	4.25E+02
1.00E-01	9.00E+01	2.26E+02	8.12E+02	1.18E+03	5.29E+02	8.17E+02
1.50E-01	1.35E+02	3.37E+02	1.20E+03	1.75E+03	7.82E+02	1.21E+03
5.00E-01	4.46E+02	1.08E+03	3.66E+03	5.53E+03	2.53E+03	3.91E+03
1.00E+00	8.80E+02	2.09E+03	6.67E+03	1.05E+04	4.98E+03	7.63E+03
1.59E+00	1.35E+03	3.27E+03	1.05E+04	1.68E+04	7.71E+03	1.19E+04
5.00E+00	4.16E+03	9.20E+03	3.04E+04	4.75E+04	2.30E+04	3.42E+04
1.00E+01	7.97E+03	1.71E+04	5.62E+04	8.83E+04	4.34E+04	6.26E+04
2.00E+01	1.51E+04	3.08E+04	1.04E+05	1.61E+05	8.39E+04	1.20E+05
Average	**3.02E+03**	**6.42E+03**	**2.14E+04**	**3.33E+04**	**1.67E+04**	**2.43E+04**

Table D.12 |G*|sin δ values for Buncombe County materials, 70° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	4.24E+00	9.56E+00	5.33E+01	9.68E+01	4.53E+01	6.19E+01
5.00E-02	2.05E+01	4.72E+01	1.72E+02	3.53E+02	1.45E+02	2.07E+02
1.00E-01	4.10E+01	9.46E+01	3.11E+02	6.43E+02	2.49E+02	3.76E+02
1.50E-01	6.17E+01	1.41E+02	4.63E+02	9.92E+02	3.61E+02	5.56E+02
5.00E-01	2.05E+02	4.64E+02	1.47E+03	2.74E+03	1.18E+03	1.78E+03
1.00E+00	4.09E+02	9.11E+02	2.77E+03	4.74E+03	2.34E+03	3.54E+03
1.59E+00	6.33E+02	1.43E+03	5.18E+03	8.12E+03	3.69E+03	5.51E+03
5.00E+00	1.98E+03	4.17E+03	1.25E+04	2.13E+04	1.12E+04	1.61E+04
1.00E+01	3.84E+03	7.85E+03	2.40E+04	4.06E+04	2.03E+04	3.05E+04
2.00E+01	7.40E+03	1.45E+04	4.29E+04	7.55E+04	3.87E+04	5.06E+04
Average	**1.46E+03**	**2.96E+03**	**8.97E+03**	**1.55E+04**	**7.81E+03**	**1.09E+04**

Table D.13 |G*|/sin δ values for Buncombe County materials, 58° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	2.13E+01	5.55E+01	2.63E+02	3.77E+02	1.82E+02	2.85E+02
5.00E-02	1.06E+02	2.74E+02	1.06E+03	1.57E+03	6.29E+02	9.59E+02
1.00E-01	2.12E+02	5.42E+02	1.99E+03	2.93E+03	1.23E+03	1.86E+03
1.50E-01	3.16E+02	8.04E+02	2.88E+03	4.30E+03	1.83E+03	2.75E+03
5.00E-01	1.03E+03	2.53E+03	8.90E+03	1.33E+04	5.89E+03	8.73E+03
1.00E+00	2.01E+03	4.84E+03	1.70E+04	2.53E+04	1.15E+04	1.70E+04
1.59E+00	3.12E+03	7.54E+03	2.76E+04	4.08E+04	1.78E+04	2.67E+04
5.00E+00	9.28E+03	2.08E+04	7.47E+04	1.08E+05	5.46E+04	7.68E+04
1.00E+01	1.77E+04	3.82E+04	1.39E+05	1.97E+05	1.11E+05	1.50E+05
2.00E+01	3.34E+04	6.94E+04	**	3.79E+05	2.58E+05	3.28E+05
Average	**6.72E+03**	**1.45E+04**	**3.04E+04**	**7.73E+04**	**4.63E+04**	**6.14E+04**

Table D.14 |G*|/sin δ values for Buncombe County materials, 64° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	9.11E+00	2.28E+01	1.23E+02	1.36E+02	9.32E+01	1.38E+02
5.00E-02	4.49E+01	1.14E+02	4.47E+02	5.97E+02	2.83E+02	4.27E+02
1.00E-01	9.00E+01	2.26E+02	8.27E+02	1.18E+03	5.30E+02	8.19E+02
1.50E-01	1.35E+02	3.37E+02	1.22E+03	1.75E+03	7.83E+02	1.21E+03
5.00E-01	4.46E+02	1.08E+03	3.67E+03	5.54E+03	2.54E+03	3.93E+03
1.00E+00	8.82E+02	2.09E+03	6.67E+03	1.05E+04	5.03E+03	7.70E+03
1.59E+00	1.35E+03	3.27E+03	1.06E+04	1.68E+04	7.86E+03	1.21E+04
5.00E+00	4.19E+03	9.20E+03	3.28E+04	4.81E+04	2.62E+04	3.68E+04
1.00E+01	8.06E+03	1.71E+04	7.87E+04	9.74E+04	6.51E+04	7.87E+04
2.00E+01	1.54E+04	3.08E+04	3.07E+05	2.50E+05	2.38E+05	1.81E+05
Average	**3.06E+03**	**6.42E+03**	**4.42E+04**	**4.32E+04**	**3.46E+04**	**3.23E+04**

Table D.15 |G*|/sin δ values for Buncombe County materials, 70° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	4.24E+00	9.56E+00	5.84E+01	1.07E+02	5.13E+01	6.71E+01
5.00E-02	2.05E+01	4.72E+01	1.78E+02	3.71E+02	1.48E+02	2.09E+02
1.00E-01	4.10E+01	9.46E+01	3.19E+02	6.67E+02	2.50E+02	3.77E+02
1.50E-01	6.17E+01	1.42E+02	4.70E+02	1.01E+03	3.62E+02	5.57E+02
5.00E-01	2.05E+02	4.65E+02	1.47E+03	2.76E+03	1.19E+03	1.79E+03
1.00E+00	4.09E+02	9.14E+02	2.79E+03	4.74E+03	2.38E+03	3.59E+03
1.59E+00	6.34E+02	1.44E+03	5.28E+03	8.14E+03	3.76E+03	5.69E+03
5.00E+00	1.99E+03	4.23E+03	1.98E+04	2.47E+04	1.41E+04	2.00E+04
1.00E+01	3.88E+03	8.03E+03	9.27E+04	7.10E+04	6.16E+04	5.68E+04
2.00E+01	7.57E+03	1.51E+04	4.50E+05	4.11E+05	3.31E+05	3.31E+05
Average	**1.48E+03**	**3.05E+03**	**5.73E+04**	**5.25E+04**	**4.14E+04**	**4.20E+04**

Table D.16 |G*|cos δ values for Buncombe County materials, 58° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	2.26E-01	6.48E-01	4.72E+01	4.81E+01	3.24E+01	4.66E+01
5.00E-02	1.31E+00	8.63E+00	1.15E+02	1.17E+02	3.47E+01	5.23E+01
1.00E-01	3.56E+00	2.63E+01	1.69E+02	1.85E+02	5.64E+01	1.02E+02
1.50E-01	6.31E+00	4.84E+01	2.18E+02	2.71E+02	8.54E+01	1.61E+02
5.00E-01	4.36E+01	2.54E+02	5.57E+02	9.76E+02	3.90E+02	7.23E+02
1.00E+00	1.21E+02	6.05E+02	1.01E+03	2.08E+03	1.06E+03	1.81E+03
1.59E+00	2.27E+02	1.09E+03	1.65E+03	3.75E+03	2.00E+03	3.46E+03
5.00E+00	9.92E+02	3.99E+03	8.53E+02	6.62E+03	1.18E+04	1.73E+04
1.00E+01	2.35E+03	8.43E+03	1.74E+04	5.50E+03	3.83E+04	4.83E+04
2.00E+01	5.56E+03	1.75E+04	**	7.60E+04	1.20E+05	1.46E+05
Average	9.31E+02	3.19E+03	2.44E+03	9.55E+03	1.74E+04	2.17E+04

Table D.17 |G*|cos δ values for Buncombe County materials, 64° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	3.48E-01	1.33E-01	2.71E+01	1.64E+01	2.21E+01	2.74E+01
5.00E-02	5.27E-01	1.57E+00	7.40E+01	3.93E+01	1.97E+01	2.57E+01
1.00E-01	9.81E-01	5.37E+00	1.12E+02	6.83E+01	2.38E+01	3.93E+01
1.50E-01	1.80E+00	1.05E+01	1.31E+02	8.45E+01	3.67E+01	6.15E+01
5.00E-01	1.18E+01	7.16E+01	2.06E+02	2.06E+02	1.71E+02	2.79E+02
1.00E+00	3.31E+01	1.82E+02	9.28E+01	2.89E+02	5.07E+02	7.48E+02
1.59E+00	6.72E+01	3.45E+02	4.90E+02	2.74E+02	1.10E+03	1.46E+03
5.00E+00	3.46E+02	1.40E+03	8.54E+03	5.50E+03	8.56E+03	9.35E+03
1.00E+01	8.76E+02	3.14E+03	3.56E+04	2.84E+04	3.07E+04	3.18E+04
2.00E+01	2.25E+03	6.89E+03	1.45E+05	1.20E+05	1.14E+05	8.56E+04
Average	**3.59E+02**	**1.20E+03**	**1.90E+04**	**1.54E+04**	**1.55E+04**	**1.29E+04**

Table D.18 |G*|cos δ values for Buncombe County materials, 70° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	1.08E-01	1.18E-01	1.66E+01	3.12E+01	1.64E+01	1.79E+01
5.00E-02	3.40E-01	4.02E-01	3.30E+01	7.81E+01	1.94E+01	2.02E+01
1.00E-01	5.40E-01	1.19E+00	4.88E+01	1.22E+02	1.63E+01	2.08E+01
1.50E-01	7.81E-01	2.45E+00	5.85E+01	1.51E+02	2.12E+01	2.93E+01
5.00E-01	3.46E+00	1.83E+01	4.62E+01	2.32E+02	1.04E+02	1.43E+02
1.00E+00	9.91E+00	5.31E+01	2.06E+02	1.41E+02	3.11E+02	4.31E+02
1.59E+00	2.22E+01	1.06E+02	7.02E+02	3.98E+02	5.23E+02	9.95E+02
5.00E+00	1.35E+02	4.93E+02	9.56E+03	8.45E+03	5.71E+03	7.94E+03
1.00E+01	3.85E+02	1.19E+03	4.06E+04	3.51E+04	2.89E+04	2.83E+04
2.00E+01	1.12E+03	2.90E+03	1.32E+05	1.59E+05	1.06E+05	1.19E+05
Average	**1.68E+02**	**4.77E+02**	**1.83E+04**	**2.04E+04**	**1.42E+04**	**1.57E+04**

Table D.19 |G*|sin δ values for Rutherford County materials, 58° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	1.58E+01	4.79E+01	1.61E+02	1.61E+02	***	1.14E+02
5.00E-02	7.84E+01	2.35E+02	6.13E+02	5.94E+02	***	5.03E+02
1.00E-01	1.57E+02	4.62E+02	1.20E+03	1.17E+03	***	9.87E+02
1.50E-01	2.34E+02	6.85E+02	1.79E+03	1.75E+03	***	1.46E+03
5.00E-01	7.67E+02	2.14E+03	5.76E+03	5.50E+03	***	4.65E+03
1.00E+00	1.50E+03	4.07E+03	1.12E+04	1.07E+04	***	8.97E+03
1.59E+00	2.36E+03	6.28E+03	1.70E+04	1.66E+04	***	1.41E+04
5.00E+00	6.92E+03	1.70E+04	4.96E+04	4.72E+04	***	3.96E+04
1.00E+01	1.32E+04	3.09E+04	9.18E+04	8.69E+04	***	7.54E+04
2.00E+01	2.45E+04	5.44E+04	1.67E+05	1.61E+05	***	1.36E+05
Average	**4.97E+03**	**1.16E+04**	**3.46E+04**	**3.31E+04**	***	**2.82E+04**

Table D.20 |G*|sin δ values for Rutherford County materials, 64° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	6.96E+00	1.94E+01	8.49E+01	7.91E+01	3.69E+01	5.83E+01
5.00E-02	3.38E+01	9.63E+01	2.71E+02	2.63E+02	1.46E+02	2.31E+02
1.00E-01	6.78E+01	1.93E+02	5.15E+02	4.99E+02	2.81E+02	4.44E+02
1.50E-01	1.02E+02	2.88E+02	7.65E+02	7.43E+02	4.20E+02	6.60E+02
5.00E-01	3.35E+02	9.25E+02	2.47E+03	2.41E+03	1.36E+03	2.15E+03
1.00E+00	6.63E+02	1.78E+03	4.83E+03	4.71E+03	2.73E+03	4.12E+03
1.59E+00	1.05E+03	2.76E+03	7.51E+03	7.36E+03	4.10E+03	6.68E+03
5.00E+00	3.14E+03	7.83E+03	2.27E+04	2.18E+04	1.27E+04	1.96E+04
1.00E+01	6.04E+03	1.45E+04	4.22E+04	4.04E+04	2.40E+04	3.61E+04
2.00E+01	1.15E+04	2.64E+04	8.08E+04	7.59E+04	4.34E+04	6.70E+04
Average	**2.29E+03**	**5.48E+03**	**1.62E+04**	**1.54E+04**	**8.91E+03**	**1.37E+04**

Table D.21 |G*|sin δ values for Rutherford County materials, 70° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	3.29E+00	8.24E+00	4.14E+01	4.21E+01	2.07E+01	3.52E+01
5.00E-02	1.65E+01	4.02E+01	1.35E+02	1.29E+02	7.30E+01	1.29E+02
1.00E-01	3.29E+01	8.11E+01	2.30E+02	2.24E+02	1.27E+02	2.47E+02
1.50E-01	4.95E+01	1.21E+02	3.37E+02	3.27E+02	1.85E+02	3.60E+02
5.00E-01	1.64E+02	3.98E+02	1.10E+03	1.07E+03	6.08E+02	1.17E+03
1.00E+00	3.27E+02	7.81E+02	2.17E+03	2.09E+03	1.21E+03	2.33E+03
1.59E+00	5.15E+02	1.22E+03	3.22E+03	3.14E+03	1.39E+03	3.48E+03
5.00E+00	1.58E+03	3.56E+03	1.01E+04	1.01E+04	5.89E+03	1.09E+04
1.00E+01	3.07E+03	6.72E+03	1.89E+04	2.00E+04	1.09E+04	2.07E+04
2.00E+01	5.87E+03	1.24E+04	3.57E+04	3.50E+04	1.98E+04	3.78E+04
Average	**1.16E+03**	**2.54E+03**	**7.19E+03**	**7.23E+03**	**4.02E+03**	**7.71E+03**

Table D.22 |G*|/sin δ values for Rutherford County materials, 58° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	1.58E+01	4.79E+01	1.65E+02	1.64E+02	***	1.14E+02
5.00E-02	7.84E+01	2.35E+02	6.14E+02	5.95E+02	***	5.03E+02
1.00E-01	1.57E+02	4.64E+02	1.21E+03	1.17E+03	***	9.88E+02
1.50E-01	2.34E+02	6.88E+02	1.80E+03	1.75E+03	***	1.47E+03
5.00E-01	7.68E+02	2.17E+03	5.79E+03	5.53E+03	***	4.68E+03
1.00E+00	1.51E+03	4.13E+03	1.13E+04	1.08E+04	***	9.09E+03
1.59E+00	2.37E+03	6.42E+03	1.73E+04	1.69E+04	***	1.44E+04
5.00E+00	6.99E+03	1.77E+04	5.27E+04	5.07E+04	***	4.35E+04
1.00E+01	1.34E+04	3.25E+04	1.09E+05	1.06E+05	***	8.97E+04
2.00E+01	2.52E+04	5.83E+04	2.60E+05	2.56E+05	***	2.57E+05
Average	**5.07E+03**	**1.23E+04**	**4.60E+04**	**4.50E+04**	***	**4.21E+04**

Table D.23 |G*|/sin δ values for Rutherford County materials, 64° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	6.96E+00	1.94E+01	8.87E+01	8.26E+01	3.77E+01	5.91E+01
5.00E-02	3.39E+01	9.63E+01	2.72E+02	2.64E+02	1.47E+02	2.32E+02
1.00E-01	6.78E+01	1.93E+02	5.16E+02	4.99E+02	2.81E+02	4.44E+02
1.50E-01	1.02E+02	2.88E+02	7.66E+02	7.44E+02	4.21E+02	6.60E+02
5.00E-01	3.35E+02	9.29E+02	2.48E+03	2.42E+03	1.37E+03	2.16E+03
1.00E+00	6.64E+02	1.80E+03	4.89E+03	4.77E+03	2.78E+03	4.19E+03
1.59E+00	1.05E+03	2.79E+03	7.67E+03	7.53E+03	4.24E+03	6.81E+03
5.00E+00	3.16E+03	8.02E+03	2.54E+04	2.44E+04	1.63E+04	2.19E+04
1.00E+01	6.11E+03	1.50E+04	6.40E+04	6.04E+04	5.38E+04	5.90E+04
2.00E+01	1.18E+04	2.77E+04	2.05E+05	2.12E+05	3.03E+05	2.18E+05
Average	**2.33E+03**	**5.68E+03**	**3.11E+04**	**3.13E+04**	**3.83E+04**	**3.14E+04**

Table D.24 |G*|/sin δ values for Rutherford County materials, 70° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	3.29E+00	8.25E+00	4.53E+01	4.64E+01	2.11E+01	3.59E+01
5.00E-02	1.65E+01	4.02E+01	1.37E+02	1.30E+02	7.35E+01	1.29E+02
1.00E-01	3.29E+01	8.12E+01	2.31E+02	2.25E+02	1.27E+02	2.47E+02
1.50E-01	4.95E+01	1.21E+02	3.38E+02	3.28E+02	1.86E+02	3.61E+02
5.00E-01	1.64E+02	3.99E+02	1.11E+03	1.08E+03	6.18E+02	1.18E+03
1.00E+00	3.28E+02	7.84E+02	2.23E+03	2.15E+03	1.28E+03	2.38E+03
1.59E+00	5.15E+02	1.22E+03	3.41E+03	3.30E+03	1.63E+03	3.70E+03
5.00E+00	1.59E+03	3.62E+03	1.56E+04	1.34E+04	1.16E+04	1.59E+04
1.00E+01	3.10E+03	6.88E+03	6.07E+04	4.43E+04	7.85E+04	4.68E+04
2.00E+01	6.02E+03	1.30E+04	3.59E+05	3.22E+05	5.09E+05	2.73E+05
Average	**1.18E+03**	**2.61E+03**	**4.42E+04**	**3.87E+04**	**6.03E+04**	**3.44E+04**

Table D.25 |G*|cos δ values for Rutherford County materials, 58° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	2.62E-01	6.17E-01	2.47E+01	2.26E+01	***	7.31E+00
5.00E-02	6.74E-01	7.60E+00	2.50E+01	2.30E+01	***	1.33E+01
1.00E-01	2.43E+00	2.33E+01	4.73E+01	4.55E+01	***	3.78E+01
1.50E-01	4.62E+00	4.23E+01	7.72E+01	7.22E+01	***	6.73E+01
5.00E-01	3.04E+01	2.20E+02	3.97E+02	4.21E+02	***	3.75E+02
1.00E+00	8.49E+01	5.27E+02	1.10E+03	1.15E+03	***	1.04E+03
1.59E+00	1.61E+02	9.31E+02	2.10E+03	2.16E+03	***	1.92E+03
5.00E+00	7.18E+02	3.36E+03	1.25E+04	1.29E+04	***	1.23E+04
1.00E+01	1.70E+03	7.07E+03	3.93E+04	4.10E+04	***	3.29E+04
2.00E+01	4.06E+03	1.45E+04	1.25E+05	1.24E+05	***	1.28E+05
Average	**6.76E+02**	**2.67E+03**	**1.80E+04**	**1.82E+04**	***	**1.77E+04**

Table D.26 |G*|cos δ values for Rutherford County materials, 64° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	9.46E-02	1.92E-01	1.81E+01	1.67E+01	5.59E+00	6.64E+00
5.00E-02	3.31E-01	1.53E+00	1.66E+01	1.42E+01	8.65E+00	7.70E+00
1.00E-01	5.89E-01	5.08E+00	2.00E+01	1.88E+01	1.02E+01	1.40E+01
1.50E-01	1.29E+00	1.02E+01	3.13E+01	3.08E+01	1.69E+01	2.32E+01
5.00E-01	8.32E+00	6.24E+01	1.69E+02	1.73E+02	1.10E+02	1.65E+02
1.00E+00	2.32E+01	1.60E+02	5.48E+02	5.24E+02	3.59E+02	5.46E+02
1.59E+00	4.96E+01	2.99E+02	1.10E+03	1.12E+03	7.56E+02	9.47E+02
5.00E+00	2.60E+02	1.20E+03	7.84E+03	7.58E+03	6.81E+03	6.65E+03
1.00E+01	6.78E+02	2.66E+03	3.03E+04	2.85E+04	2.67E+04	2.87E+04
2.00E+01	1.85E+03	5.78E+03	1.00E+05	1.02E+05	1.06E+05	1.01E+05
Average	**2.87E+02**	**1.02E+03**	**1.40E+04**	**1.40E+04**	**1.41E+04**	**1.38E+04**

Table D.27 |G*|cos δ values for Rutherford County materials, 70° C

Frequency	Binder		Baghouse Mastic		P#200 Mastic	
(Hz)	Virgin	Aged	Virgin	Aged	Virgin	Aged
1.00E-02	6.13E-02	8.51E-02	1.26E+01	1.34E+01	2.78E+00	4.73E+00
5.00E-02	2.08E-01	3.10E-01	1.70E+01	1.29E+01	5.89E+00	5.07E+00
1.00E-01	2.73E-01	1.01E+00	1.39E+01	1.24E+01	6.17E+00	7.62E+00
1.50E-01	5.18E-01	2.12E+00	1.73E+01	1.73E+01	9.72E+00	1.23E+01
5.00E-01	2.46E+00	1.60E+01	9.88E+01	1.03E+02	7.80E+01	1.03E+02
1.00E+00	7.19E+00	4.69E+01	3.52E+02	3.40E+02	2.94E+02	3.59E+02
1.59E+00	1.65E+01	9.14E+01	7.69E+02	7.07E+02	5.69E+02	8.63E+02
5.00E+00	1.04E+02	4.32E+02	7.42E+03	5.74E+03	5.82E+03	7.39E+03
1.00E+01	2.93E+02	1.05E+03	2.81E+04	2.20E+04	2.71E+04	2.32E+04
2.00E+01	9.25E+02	2.58E+03	1.07E+05	1.00E+05	9.83E+04	9.43E+04
Average	**1.35E+02**	**4.22E+02**	**1.44E+04**	**1.29E+04**	**1.32E+04**	**1.26E+04**

APPENDIX E – APA TEST REULTS

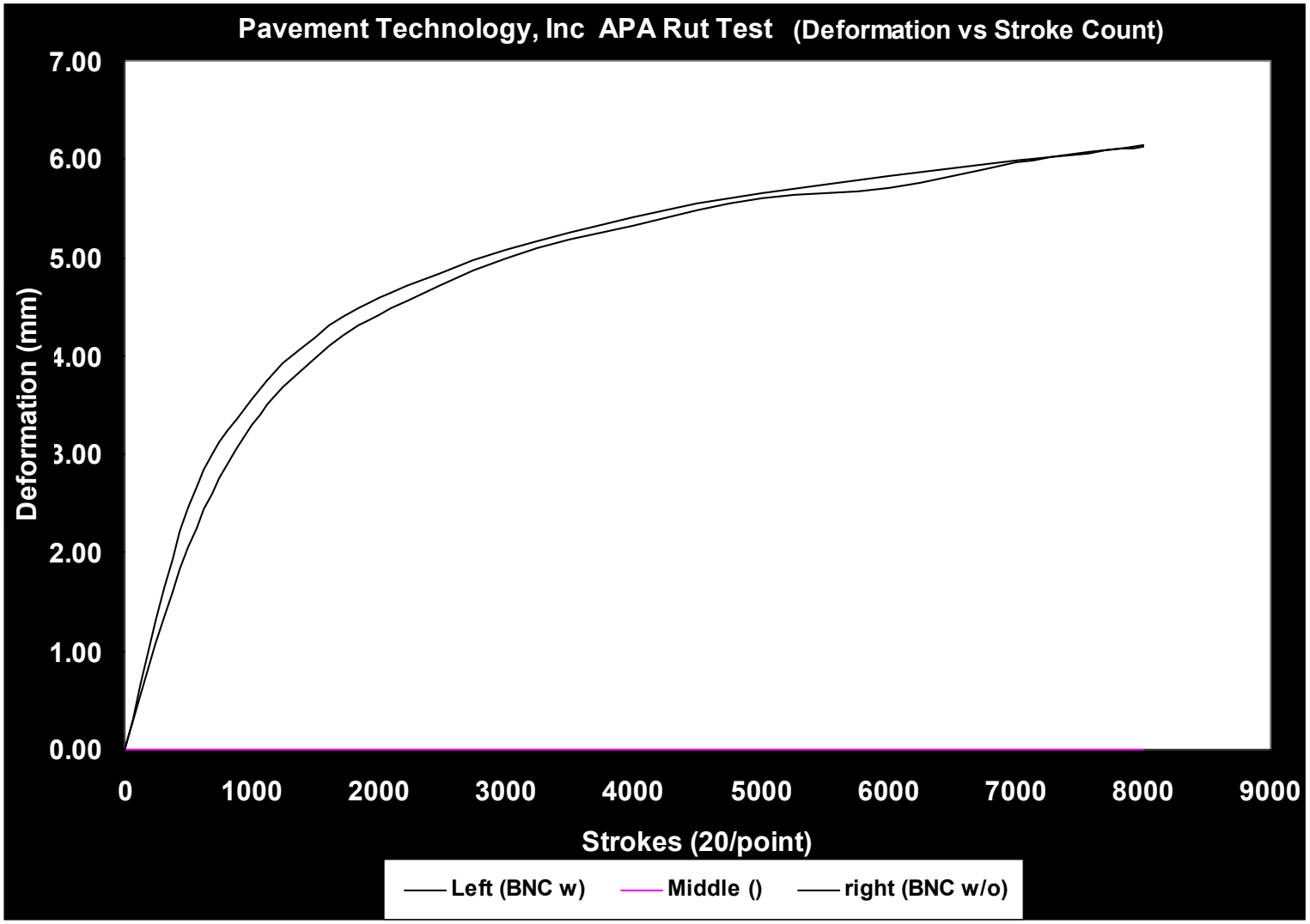
Rutting Test Data Sheet

Project No. :	~~NC State~~	Test No. :	R1210-1	Temperature :	~~50~~ (deg. C)
Mix ID No. :	~~Buncombe Co.~~	Test Date :	12/10/99	Wheel Load :	~~100~~ (lbs)
Mix Type :		Data File :	R1210_1.ptd	Hose Pressure :	~~100~~ (psi)
Operator :		Run Status:	Complete	Run Time	2:14:43 (hh:mm:ss)

Left Sample ID	BNC w		Bulk S Gravity					% Air Void			
Stroke	Temperature		Depth Gauge Reading(mm)					Manual	Net Man	APA-DAS	Percent
Count	F	C	1	2	3	4	5	Average	Deflection	Average	Change
0									0	0	
500										2.467	
1000										3.554	44.1
1500										4.181	17.6
2000										4.592	9.8
3000										5.081	10.7
4000										5.403	6.3
5000										5.653	4.6
6000										5.831	3.2
7000										5.981	2.6
8000										6.152	2.9
8001										6.152	0

Middle Sample ID			Bulk S Gravity					% Air Void			
Stroke	Temperature		Depth Gauge Reading(mm)					Manual	Net Man	APA-DAS	Percent
Count	F	C	1	2	3	4	5	Average	Deflection	Average	Change
0									0	0	
500										0	
1000										0	
1500										0	
2000										0	
3000										0	
4000										0	
5000										0	
6000										0	
7000										0	
8000										0	
8001										0	

Right Sample ID	BNC w/o		Bulk S Gravity					% Air Void			
Stroke	Temperature		Depth Gauge Reading(mm)					Manual	Net Man	APA-DAS	Percent
Count	F	C	1	2	3	4	5	Average	Deflection	Average	Change
0									0	0	
500										2.065	
1000										3.294	59.5
1500										3.98	20.8
2000										4.418	11
3000										4.993	13
4000										5.317	6.5
5000										5.595	5.2
6000										5.715	2.1
7000										5.967	4.4
8000										6.128	2.7
8001										6.124	-0.1


Pavement Technology, Inc APA Rut Test (Deformation vs Stroke Count)
Deformation (mm)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Strokes (20/point)
Left (BNC w)
Middle ()
right (BNC w/o)

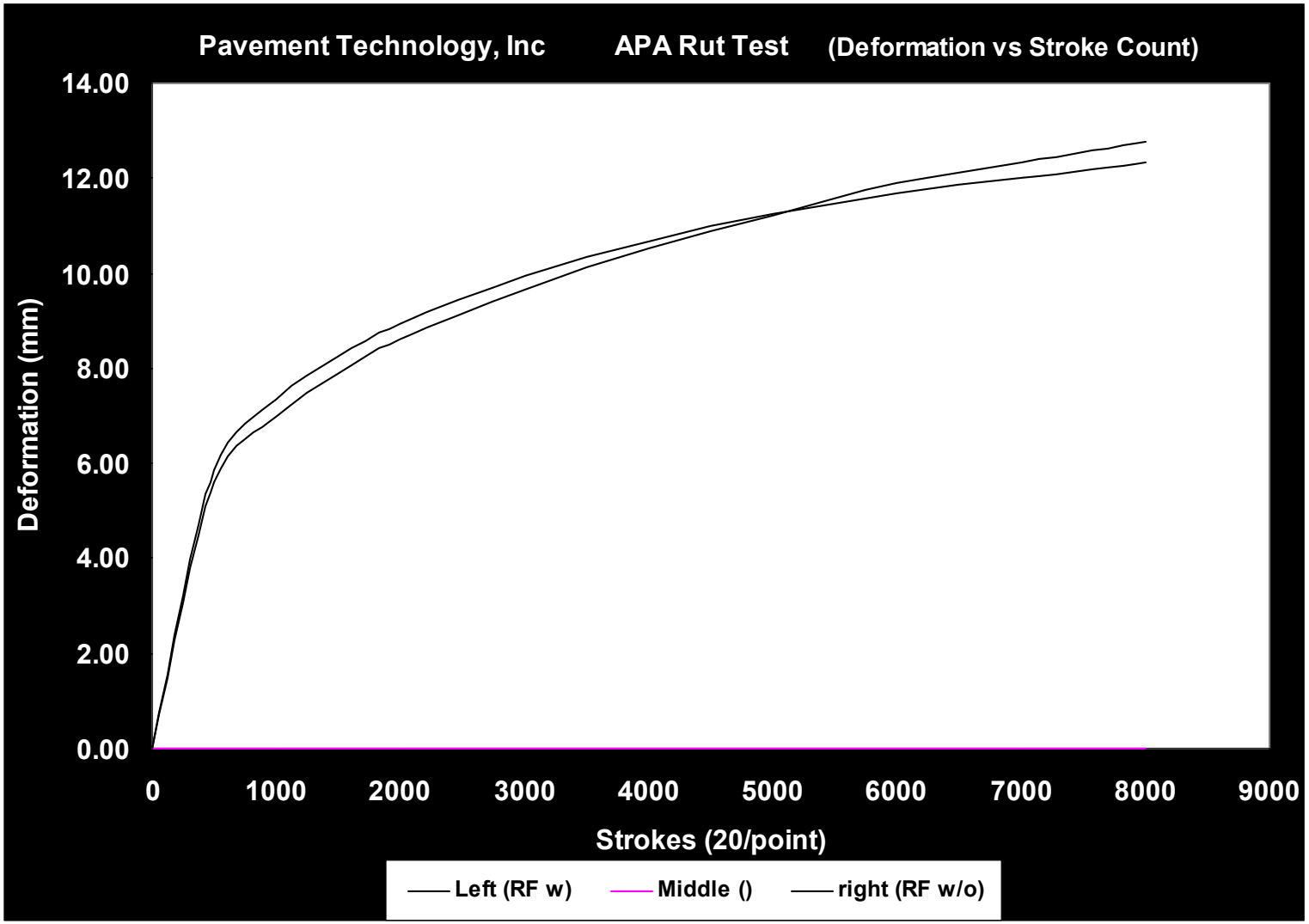
Rutting Test Data Sheet

Project No. :	~~NC State~~	Test No. : R1209-1		Temperature : ~~50~~	(deg. C)
Mix ID No. :	~~Rutherford Co.~~	Test Date : 12/09/99		Wheel Load : ~~100~~	(lbs)
Mix Type :		Data File : R1209_1.ptd		Hose Pressure : ~~100~~	(psi)
Operator :		Run Status: Complete		Run Time 2:14:38	(hh:mm:ss)

Left Sample ID		RF w		Bulk S Gravity					% Air Void			
Stroke	Temperature		Depth Gauge Reading(mm)					Manual	Net Man	APA-DAS	Percent
Count	F	C	1	2	3	4	5	Average	Deflection	Average	Change
0									0	0	
500										5.858	
1000										7.328	25.1
1500										8.237	12.4
2000										8.929	8.4
3000										9.953	11.5
4000										10.657	7.1
5000										11.246	5.5
6000										11.691	4
7000										12.01	2.7
8000										12.335	2.7
8001										12.335	0

Middle Sample ID			Bulk S Gravity					% Air Void			
Stroke	Temperature		Depth Gauge Reading(mm)					Manual	Net Man	APA-DAS	Percent
Count	F	C	1	2	3	4	5	Average	Deflection	Average	Change
0									0	0	
500										0	
1000										0	
1500										0	
2000										0	
3000										0	
4000										0	
5000										0	
6000										0	
7000										0	
8000										0	
8001										0	

Right Sample ID BNC w/o			Bulk S Gravity					% Air Void			
Stroke	Temperature		Depth Gauge Reading(mm)					Manual	Net Man	APA-DAS	Percent
Count	F	C	1	2	3	4	5	Average	Deflection	Average	Change
0									0	0	
500										5.616	
1000										6.982	24.3
1500										7.901	13.2
2000										8.602	8.9
3000										9.655	12.2
4000										10.513	8.9
5000										11.197	6.5
6000										11.891	6.2
7000										12.331	3.7
8000										12.782	3.7
8001										12.782	0


Pavement Technology, Inc
APA Rut Test
(Deformation vs Stroke Count)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Deformation (mm)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Strokes (20/point)
Left (RF w)
Middle ()
right (RF w/o)