Shannon Sinn
QC Manager

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A COLAS COMPANY

H & B 2 ½ Ton Batch Plant

Cedar Rapids 400 TPH Drum Mix

How Plant Operations Can Affect the Quality of the Mix

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See Something Say Something Communication Between QC & Plant Personnel

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MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION

MoDOT

2024

Fourth Edition

April 2025

Missouri Highways and Transportation Commission

SECTION 404
BITUMINOUS MIXING PLANTS

404.1 Description. This specification covers the requirements for mixing plants and equipment used in the production of bituminous mixtures.

404.2 Requirements for All Plants.

404.2.1 Aggregate. Sufficient storage space shall be provided for each size of aggregate. The different aggregate sizes shall be kept separated until delivery to the combined cold feed belt. The storage yard shall be maintained in a neat and orderly condition and the separate stockpiles shall be readily accessible for sampling.

404.2.2 Asphalt Binder. An asphalt binder storage tank shall be provided at the proportioning and mixing plant. If more than one storage tank is used to deliver asphalt binder to the proportioning unit, piping and valve arrangements shall permit material to be used from any one of the tanks without using from another at the same time.

404.2.2.1 Storage. Each tank used for storage from which asphalt binder is delivered to the proportioning unit shall be equipped for heating the material under effective and positive control at all times to the temperature requirements set forth in Sec 1015. Heating shall not allow contact of flame with the heating tank. The contractor shall furnish a tank capacity chart calculated in increments suitable for verifying quantities used during a normal production period.

404.2.2.2 Circulation. A circulating system of adequate capacity shall provide proper and continuous circulation of the asphalt binder between the storage tank and proportioning units during the entire operating period. The discharge end of the circulating pipe shall be maintained below the surface of the asphalt binder in the storage tank to prevent discharging into the open air. All pipe lines and fittings shall be properly insulated to prevent heat loss.

404.2.2.3 Binder Sampling. The contractor shall provide a sampling outlet in the asphalt binder feed lines connecting the plant storage tanks to the proportioning or injection system. The sampling outlet shall be installed in a readily accessible location such that representative samples may be withdrawn safely and slowly at any time during plant operation. A drainage receptacle shall be provided for flushing the outlet prior to sampling. When all of the chemical admixtures are added to the plant storage tank prior to use, the engineer may allow the contractor to sample the asphalt binder from the storage tanks located at the mixing facilities. Sampling procedures shall be approved by the engineer prior to samples being taken.

404.2.3 Cold Aggregate Feeder. The plant shall be provided with an accurate mechanical means for uniformly feeding the aggregate into the drier to provide uniform production and temperature. A synchronized method of proportioning the aggregate at the cold feeder shall be provided.

404.2.3.1 Cold Feed Calibration. For all plants producing bituminous mixtures composed of more than one fraction of aggregate, the aggregate cold feeds shall be calibrated as required by the engineer. On the basis of the calibration, aggregate cold feeds shall be adjusted to ensure the proper percentage of the various aggregate fractions of the mix, as required by the job mix formula.

404.2.3.2 Aggregate Sampling. Safe, adequate and convenient facilities shall be provided for obtaining representative aggregate samples from the full width and length of the discharge flow of the combined cold feed, or from each hot bin on batch-type plants.

404.2.4 Drier. A drier of any satisfactory design for drying and heating the aggregate shall be provided. The drier shall be capable of drying and heating the aggregate to a temperature within the limits of the range specified in Sec 1015 for the grade of asphalt binder used, without leaving any visible unburned oil or carbon residue on the aggregate. The mixture may be tested for contamination. Absorbed moisture in the aggregate shall be reduced to such a quantity that there is no visible segregation of asphalt binder resulting from escaping water vapor in the prepared mixture.

404.2.5 Dust Collector. An efficient dust collecting system shall be provided to prevent the loss of fine material into the surrounding environment. The material collected may be returned to the mixture at a uniform rate through a metering device or the dust may be wasted.

Plant Calibration

Drum Mix

Asphalt Pump
Aggregate Belt Scale
Cold Feed Bins
RAP Belt Scale
Mineral Filler System
Loadout/Truck Scale

Batch Plants

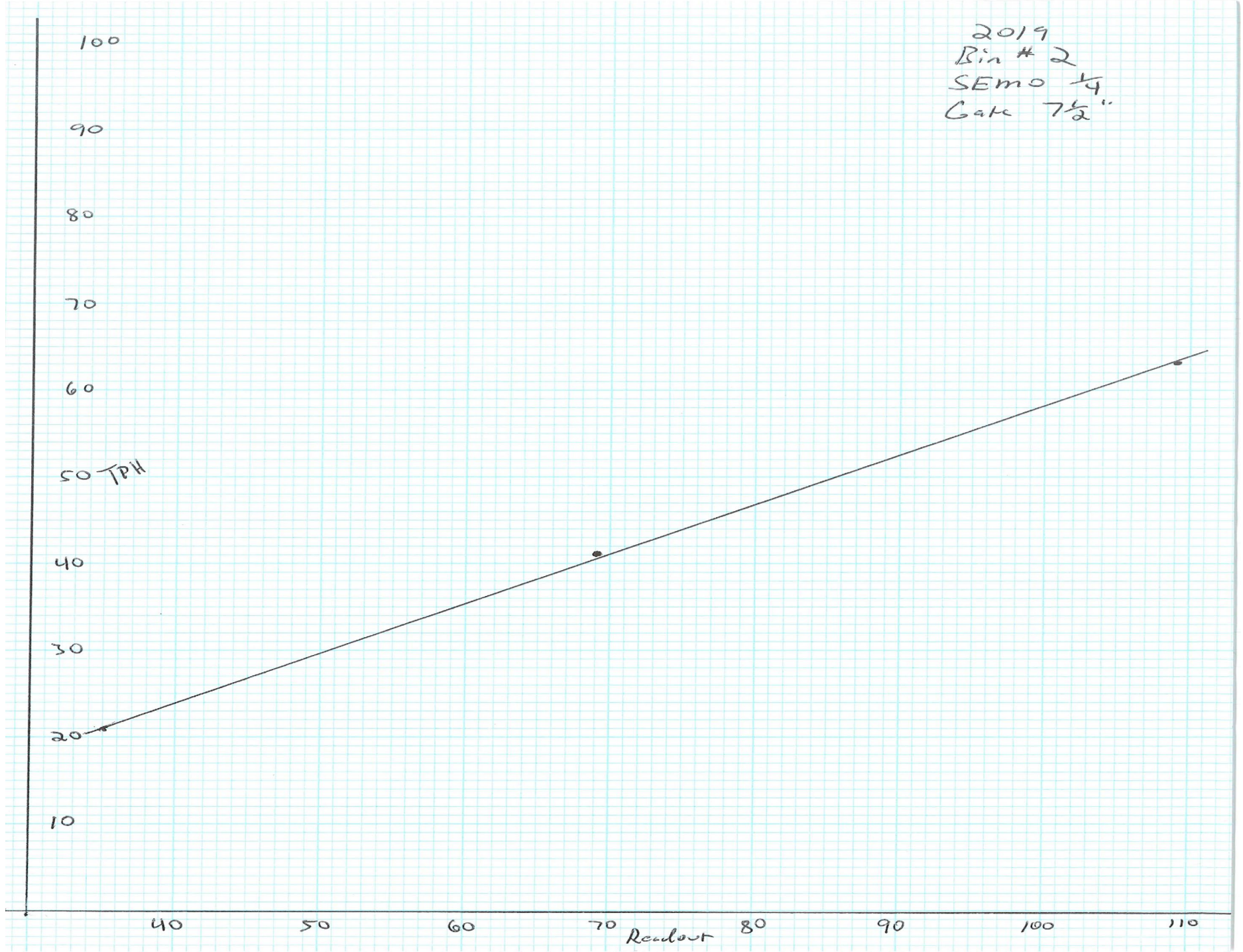
Aggregage Scales
Asphalt Scales
Cold Feed Bins
Truck Scale

Belt Scale Calibration


2
3
4


DANGER
DELTA


DELTA
NAPA
DIAMOND
ACHIEVEMENT
COMMENDATION


2019
Bin # 2
SEMO ¼
Gate 7½"
100
90
80
70
60
50 TPH
40
30
20
10
40
50
60
70
Readout
80
90
100
110


DELTA
Companies Inc
NAPA
DIAMOND
ACHIEVEMENT
COMMENDATION
CAUTION
POWER LINES
OVERHEAD

Batch Plant Tower

RAP Belt

RAP Feeder


CAT


DELTA
Companies Inc.
NAPA
DIAMOND
ACHIEVEMENT
COMMENDATION
ASTEC
ASTEC
ASTEC
3
2


ADMIX
DELT
Companie
AESCO MARSEN

Jonathan Varner

Digitally signed by Jonathan Varner
Date: 2019.09.24 08:33:38 -05'00'

MISSOURI DEPARTMENT OF TRANSPORTATION - DIVISION OF MATERIALS

ASPHALTIC CONCRETE TYPE SP125CLG

DATE = 09/23/19 | CONTRACTOR = APEX PAVING COMPANY | SP125 19-90

IDENT. NO.	PRODUCT CODE	/ PRODUCER, LOCATION	BULK SP. GR.	APPAR. SP. GR.	%ABS	FORMATION	LEDGES	% CHERT
19SEMA054	100207..LD1	/ Southeast Missouri Stone (SEMO), Cape Girardeau, MO	2.689	2.740	0.7	Plattin	34-22	0.2
19SEMA055	100205..LD1	/ Southeast Missouri Stone (SEMO), Cape Girardeau, MO	2.687	2.742	0.8	Plattin	34-22	0.1
19SEMA056	100204..LD1	/ Southeast Missouri Stone (SEMO), Cape Girardeau, MO	2.683	2.764	1.1	Plattin	34-22	
19SEMA058	1002NS..NS1	/ Brenda Kay Sand, LLC (Shakespear Oil), Benton, MO	2.596	2.651		Mississippi River Field Sand	FIELD SAND	
19SEMA101	1002..RAP1	/ Delta Asphalt, Cape Girardeau, MO	2.656	2.656		RAP	5.3% AC	
19SEMA028	1015ACPG..6422H	/ Heartland Asphalt Materials, New Madrid (MFG W.R., IL)	1.034		PG64-22H	Gyro Mold Temp. 284-294°F		

IN-LINE GRADE = PG64-22H | CONTRACT GRADE = PG70-22

MATERIAL IDENT #	19SEMA054	19SEMA055	19SEMA056	19SEMA058	19SEMA101	19SEMA054	19SEMA055	19SEMA056	19SEMA058	19SEMA101	COMB.
19090	3/4"	1/2"	3/8"	NS	RAP	5.0	36.0	28.0	6.0	25.0	GRAD
1 1/2"	100.0	100.0	100.0	100.0	100.0	5.0	36.0	28.0	6.0	25.0	100.0
1"	100.0	100.0	100.0	100.0	100.0	5.0	36.0	28.0	6.0	25.0	100.0
3/4"	100.0	100.0	100.0	100.0	100.0	5.0	36.0	28.0	6.0	25.0	100.0
1/2"	43.2	100.0	100.0	100.0	91.8	2.2	36.0	28.0	6.0	23.0	95.1
3/8"	4.9	82.3	100.0	100.0	79.0	0.2	29.6	28.0	6.0	19.8	83.6
#4	1.7	6.6	93.2	99.7	39.5	0.1	2.4	26.1	6.0	9.9	44.4
#8	1.4	2.5	58.5	97.7	26.8	0.1	0.9	16.4	5.9	6.7	29.9
#16	1.3	2.1	35.1	93.4	20.2	0.1	0.8	9.8	5.6	5.1	21.3
#30	1.2	1.8	22.4	79.8	16.5	0.1	0.6	6.3	4.8	4.1	15.9
#50	1.1	1.6	14.6	33.1	13.5	0.1	0.6	4.1	2.0	3.4	10.1
#100	1.0	1.4	10.2	3.2	11.8	0.1	0.5	2.9	0.2	3.0	6.6
#200	0.7	1.2	8.9	0.3	10.20		0.4	2.5		2.6	5.5

LABORATORY CHARACTERISTICS AASHTO T312									MIX COMPOSITION	
	Gmm =	2.514	% VOIDS =	4.0	TSR =	94	TSR Wt.		MIN. AGG.	94.7%
	Gmb =	2.413	V.M.A. =	14.5	-200/AC =	1.3	3800	Ndes = 80	VIRGIN ASPHALT CONTENT	4.0%
	Gsb =	2.673	% FILLED =	72	Gyro Wt. =	4800			ASPHALT CONTENT W/ RAP	5.3%

CALIBRATION NUMBER XXXXX | MASTER GAUGE BACK CNT. = XXXX | A1 = -X.XXXXXX

MASTER GAUGE SER. NO. = XXXXX | SAMPLE WEIGHT = XXXX | A2 = X.XXXXXX

Aggregate & Mixture Properties Based on Contractors Mix Design


5
4
3
2
1
CAT 966M


CAUTION
45 MPH


DELTA
Companies Inc.
NAPA
DIAMOND
ACHIEVEMENT
COMMENDATION


STOP
ONLY 1 TRUCK ON SCALE
AT A TIME
BE SURE TAIL GATES ARE LATCHED


CAT


DELTA
Companies Inc.
NAPA
DIAMOND
ACHIEVEMENT
COMMENDATION
ASTEC
ASTEC
ASTEC
3
2

Segregation

Asphalt Mix Temperatures

Asphalt Plant Mixing Temperatures

Asphalt mix temperature is generally between 310 – 340 degrees depending the binder grade and amount of RAP used in the mix.

PG64-22	310 F
PG76-22	340 F

Compaction Temperatures

Asphalt mix compaction temperature is typically between 290 – 325 degrees depending on the binder grade.

Liquid Asphalt Samples

MODoT Guidelines for HMA Plant Samples

Pull samples daily.
Three one-pint friction cans.
Samples are pulled from the binder line going to the mixer.
Label the cans with the binder grade.

Best Practices

Wear appropriate PPE.
Flush out the sample line before you pull the sample.
Take care to protect the samples from contamination.

Jonathan Varner

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Date: 2019.09.24 08:33:38 -05'00'

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Aggregate & Mixture Properties Based on Contractors Mix Design

THANK YOU

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