

MOISTURE AND DENSITY DETERMINATION
NUCLEAR METHOD

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DATE 07/14/20	CONTROL SECTION ID 82000	JOB NUMBER 205935A, 207914A	ROUTE NO. or STREET Major Fed-Aid HMA Resurfacing	GAUGE NO. 2127	
DENSITY INSPECTOR Ryan Castillo		CERTIFICATION NO. 31927-0522	DENSITY INSPECTOR PHONE NO. (313) 680-3222	CONSTRUCTION ENG. (MDOT) Andrea Wilcox - Detroit TSC	ASST. CON.ENG. / CONSULTANT ENG. Kevin Surhigh (HRC)

TEST			DETERMINATION OF IN-PLACE DENSITY								LOCATION OF TEST				
ORIGINAL	RECHECK	TEST DEPTH inch	COUNTS (MC)	COUNTS (DC)	DRY DENSITY PCF	WET DENSITY PCF	MOIS- TURE PCF	MOIS- TURE %	MAX DENSITY PCF	PERCENT OF COM- PACTION	STATION	DISTANCE FROM C _L ft		DEPTH BELOW PLAN GRADE ft	ITEM OF WORK *
												LEFT	RIGHT		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1		BS	63	718		147.6	7.9	5.6	156.2	94.5	Remarks		19	0.0	BT
2		BS	63	704		149.1	7.9	5.6	156.2	95.4	Remarks		14	0.0	BT
3		BS	55	726		146.9	6.8	4.8	156.2	94.0	Remarks		20	0.0	BT
4		BS	56	725		147.0	6.9	4.9	156.2	94.1	Remarks		22	0.0	BT
5		BS	59	715		148.0	7.3	5.2	156.2	94.7	Remarks		16	0.0	BT
6		BS	54	737		145.8	6.6	4.8	156.2	93.3	Remarks		24	0.0	BT
7		BS	59	723		147.2	7.3	5.2	156.2	94.2	Remarks		18	0.0	BT
8		BS	50	723		147.2	6.1	4.3	156.2	94.3	Remarks	21		0.0	BT
9		BS	57	729		146.6	7.0	5.0	156.2	93.8	Remarks	17		0.0	BT
10		BS	60	747		144.7	7.5	5.4	156.2	92.7	Remarks	23		0.0	BT
11		BS	54	707		148.8	6.6	4.7	156.2	95.3	Remarks	15		0.0	BT
12		BS	63	748		144.6	7.9	5.8	156.2	92.6	Remarks	22		0.0	BT

TEST NO.	MOIS- TURE %	VOLUME OF MOLD CU. FT.	DETERMINATION OF MAXIMUM DENSITY (SOIL & HMA)							NOTE: To convert (g) to (lbs): Wt. (g) ÷ 453.59 = Wt. (lbs)	
			WET SOIL + MOLD g	MOLD g	WET SOIL g	WET SOIL lbs	COMPACTED SOIL WET PCF	MAX DENSITY PCF	OPTIMUM MOISTURE %		
A	B	C	D	E	F	G	H	I	J	CHART STANDARDS	
5E3								156.2		DENSITY	MOISTURE
										2,786	430
										2,731	414
										OPERATING STANDARDS	
										DENSITY	MOISTURE
										2,734	427

REMARKS

Tests were taken on E.Vernor and Gratiot to Mt.Elliott. Test 1: 42.3486, -83.0347 Test 2: 42.3488, -83.0329 Test 3: 42.3494, -83.0315 Test 4: 42.3501, -83.0283

Test 5: 42.3506, -83.0283 Test 6: 42.3514, -83.0268 Test 7: 42.3521, -83.0251 Test 8: 42.3522, -83.0249 Test 9: 42.3516, -83.0262 Test 10: 42.3510, -83.0277

Test 11: 42.3504, -83.0291 Test 12: 42.3498, -83.0306

20/10 Weights	1st	2nd	DENSITY INSPECTOR'S SIGNATURE Ryan Castillo Jul 30 2020 12:29 AM DocuSign	AGENCY / COMPANY Somat Engineering, Inc. (JN. 2019086C)
3rd	4th	5th		

DENSITY REQUIREMENTS

	MINIMUM % OF COMPACTION	ITEM OF WORK	DEPTH
Original Ground			
Road Embankment Areas (if specified on the plans)	90.0	OG	9"
Bridges – as shown on the plans	95.0	OG	9"
Cut Areas			
Cuts requiring Sand Subbase	95.0	CS	9"
Cuts not requiring Sand Subbase	95.0	CN	12"
Subgrade for HMA Base, Aggregate Base and Concrete Widening	95.0	SG	9"
Embankments			
Regular	95.0	E	
Abutments with Piling	95.0	AP	
Abutments without Piling – within the limits for Structure Embankment as shown on the plans	100.0	AN	
Backfill			
Foundation Undercut Backfill for Retaining Walls, Grade Separation or Bridges	100.0	FB	
Backfill for Bridges, Culverts, Sewers, Water Main, Manholes, Catch Basins, Edge Drains and Subgrade Undercuts	95.0	B	
Pavement Structure			
Subbase	95.0	S	
Subbase for Slope Paving	90.0	SP	
Aggregate Base-used under Concrete Pavement	95.0	SS	
Aggregate Base-used under HMA Pavement	98.0	AB	
OGDC – used under Concrete and HMA Pavement	95.0	OGDC	
OGDC – used under Concrete and HMA Pavement (recycled material)	95.0	OGR	
HMA Aggregate Base (pulverized HMA used as Aggregate Base)	98.0	BAB	
Aggregate Base – used under Concrete Pavement (recycled material)	95.0	CAC	
Aggregate Base – used under HMA Pavement (recycled material)	98.0	CAB	
OGDC – Sleeper slab footprint and approach area	95.0	SLO	
OGDC – Sleeper slab footprint and approach area (recycled material)	95.0	SLOR	
Aggregate Base – Sleeper slab footprint and approach area	98.0	SLA	
Trenching – under concrete pavement	95.0	TC	
Trenching – under HMA pavement	98.0	TB	
Shoulders – Class I	98.0	SAA	
Shoulders – Class II and III	95.0	SA	
HMA Stabilization	98.0	BS	
HMA Paving – Base Course	92.0*	BB	
HMA Paving – Leveling Course	92.0*	BL	
HMA Paving – Top Course	92.0*	BT	

See JMF (form 1911) for G_{mm} value for target density value. $TMD = G_{mm} \times 62.4$

*Minimum % compaction of JMF TMD