

MOISTURE AND DENSITY DETERMINATION
NUCLEAR METHOD**DISTRIBUTION:** ORIGINAL – Construction Engineer, COPIES – Area Density Specialist, Density Technology Unit (Lansing).

*SEE REVERSE SIDE

DATE 11/20/19	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	CONSTRUCTION ENGINEER (MDOT) Andrea Wilcox (Detroit TSC)	PROJECT MANAGER Kevin Surhigh (HRC)	PROJECT MANAGER PHONE NO. (248) 535-3370

DETERMINATION OF IN-PLACE DENSITY

TEST		WET DENSITY			MOISTURE			DRY DENSITY			LOCATION OF TEST				
ORIGINAL	RECHECK	COUNTS (DC)	TEST DEPTH inch	WET DENSITY PCF	COUNTS (MC)	MOIS- TURE PCF	MOIS- TURE %	DRY DENSITY PCF	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		727	BS	147.6	65	8.3	6.0		156.2	94.5	Remarks	10		0.0	BT
2		749	BS	145.3	65	8.3	6.1		156.2	93.0	Remarks	4		0.0	BT
3		755	BS	144.7	61	7.7	5.7		156.2	92.6	Remarks	7		0.0	BT
4		719	BS	148.4	63	8.0	5.7		156.2	95.0	Remarks	4		0.0	BT
5		713	BS	149.1	56	7.0	4.9		156.2	95.5	Remarks	11		0.0	BT
6		735	BS	146.8	52	6.4	4.6		156.2	94.0	Remarks	3		0.0	BT
7		761	BS	144.1	59	7.5	5.5		156.2	92.3	Remarks	8		0.0	BT
8		739	BS	146.4	57	7.2	5.1		156.2	93.7	Remarks		5	0.0	BT
9		739	BS	146.3	68	8.8	6.4		156.2	93.6	Remarks		9	0.0	BT
10		759	BS	144.3	65	8.3	6.1		156.2	92.4	Remarks		4	0.0	BT
11		752	BS	145.0	55	6.9	5.0		156.2	92.9	Remarks		7	0.0	BT

DETERMINATION OF MAXIMUM DENSITY (Soil & Bituminous)

TEST NO.	MOIS- TURE %	VOLUME MOLD CU. FT.	DENSITY DETERMINATION							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	
1								156.2		DENSITY	MOISTURE
										2,837	432
										2,781	416
										OPERATING STANDARDS	
										DENSITY	MOISTURE
										2,792	422

REMARKS

Item of work & type of material per Density Test No. above: Test 1: 42.3455, -83.2166 Test 2: 42.3438, -83.2165 Test 3: 42.3428, -83.2165

Test 4: 42.3412, -83.2164 Test 5: 42.3397, -83.2164 Test 6: 42.3382, -83.2163 Test 7: 42.3362, -83.2162 Test 8: 42.3456, -83.2166

Test 9: 42.3443, -83.2165 Test 10: 42.3431, -83.2165 Test 11: 42.3420, -83.2164

20/10 Weights	1st	2nd	
3rd	4th	5th	DENSITY INSPECTOR'S SIGNATURE Ryan Castillo Nov 21 2019 10:42 AM
			AGENCY/COMPANY QA Consultant / Somat Engineering, Inc.

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