

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

*SEE REVERSE SIDE

DATE 11/09/19	CONTROL SECTION ID 82000	JOB NUMBER 205935A, 207914A	ROUTE NO. or STREET Major Fed-Aid HMA Resurfacing	GAUGE NO. 24315
DENSITY INSPECTOR Andy Patterson	CERTIFICATION NO. 32015-5023	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		467	BS	146.2	104	8.7	6.3		156.2	93.6	Remarks	11'		0.0	BT
2		453	BS	148.3	104	8.7	6.2		156.2	94.9	Remarks	9'		0.0	BT
3		455	BS	148.0	94	7.7	5.5		156.2	94.8	Remarks	8'		0.0	BT
4		473	BS	145.3	112	9.5	7.0		156.2	93.0	Remarks	10'		0.0	BT
5		459	BS	147.3	112	9.5	6.9		156.2	94.3	Remarks	9'		0.0	BT
6		439	BS	150.4	100	8.3	5.8		156.2	96.3	Remarks	0	0	0.0	BT
7		467	BS	146.3	88	7.1	5.1		156.2	93.6	Remarks	0	0	0.0	BT
8		456	BS	147.8	100	8.3	6.0		156.2	94.6	Remarks	0	0	0.0	BT
9		469	BS	145.9	101	8.4	6.1		156.2	93.4	Remarks	0	0	0.0	BT
10		472	BS	145.4	111	9.4	6.9		156.2	93.1	Remarks	0	0	0.0	BT
11		463	BS	146.8	101	8.4	6.1		156.2	94.0	Remarks	0	0	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
										1,916	619
										1,878	595
										OPERATING STANDARDS	
										DENSITY	MOISTURE
										1,881	598

REMARKS

IOW: BT MIX: 5E3 Test 1: 42.3893 -83.0062 Test 2: 42.3872 -83.0047 Test 3: 42.3851 -83.0032 Test 4: 42.3830 -83.0018 Test 5: 42.3811 -83.0005 Test 6: 42.3894 -83.0064 Test 7: 42.3874 -83.0049 Test 8: 42.3855 -83.0036 Test 9: 42.3834 -83.0022 Test 10: 42.3815 -83.0008 Test 11: 42.3799 -83.9997

20/10 Weights	1st	2nd	
3rd	4th	5th	DENSITY INSPECTOR'S SIGNATURE Andrew Patterson Nov 12 2019 10:24 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