STANDARD NUMBERS	DESCRIPTION	Approval Dates	
		MDSHA	FHWA
	CATEGORY "0" GENERAL		
MD 000.01	*SOILS & SOIL-AGGREGATE MIXTURES CHARACTERISTICS & PERFORMANCE*	*03/25/10*	*12/22/09*
MD 000.03	*SOILS & SOIL-AGGREGATE MIXTURES GUIDE TO CLASSIFICATION*	*03/25/10*	*12/22/09*
MD 000.04	*AASHTO CLASSIFICATION OF SOIL AND SOIL-AGGREGATE MIXTURES*	*03/25/10*	*12/22/09*
MD 000.05	*BORROW REQUIREMENTS*	*03/25/10*	*12/22/09*

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

SOILS & SOIL-AGGREGATE MIXTURES CHARACTERISTICS AND PERFORMANCE

STANDARD NO. MD 000.01

SPECIFICATION

CATEGORY CODE ITEMS

APPROVED

DIRECTOR - OFFICE OF HIGHWAY DEVELOPMENT

APPROVAL • SHA REVISIONS		APPROVAL • FEDERAL HIGHWAY ADMINISTRATION	
APPROVAL	6-11-68	APPROVAL	12-13-68
REVISED	10-1-01	REVISED	12-22-09
REVISED	3-25-10	REVISED	
REVISED		REVISED	

GENERAL CLASSIFICATION	GRANULAR MATERIALS						SILT-CLAY MATERIALS							
AASHTO GROUP CLASSIFICATION	A-1-a, A-1-b, A-3			A-1-a, A-1-b	A-2-4	A-2-5, A-2-6	A-2-7	A-4	A-6, A-7-5	A-7-6	A-7		A-5, A-6, A-7	A-8 (M145)
MSMT GROUP CLASSIFICATION	A-2		A-3	A-2-4	A-4-2	A-2-7	A-7-2	A-4	A-4-7	A-7-4	A-7	A-6	A-5	A-8
GENERAL DESCRIPTION	SAND			SILTY-SAND	SANDY-SILT	CLAYEY-SAND	SANDY-CLAY	SILT	CLAYEY SILT	SILTY-CLAY	CLAY	COLLOIDAL CLAY	MICA, DIATOMS & SILT	SWAMP MUCK
STABILITY	WHEN N.P., HIGH	WHEN PLASTIC, GOOD WHEN DRY	IDEAL WHEN CONFINED	GOOD WHEN DRY	GOOD WHEN DRY	GOOD WHEN DRY & PROPERLY COMPACTED	GOOD WHEN PROPERLY COMPACTED OR UNDISTURBED				POOR		GOOD TO POOR	NONE
USE AS A BASE	FAIR	FAIR	EXCELL.	FAIR	FAIR	POOR	UNSATISFACTORY							
USE AS A SUBBASE	EXCELL.	GOOD	EXCELL.	FAIR	FAIR	FAIR	UNSATISFACTORY							
USE AS A SUBGRADE	EXCELL.	EXCELL.	EXCELL.	FAIR	FAIR	FAIR	POOR				VERY POOR	POOR		UNSATIS-FACTORY
FILLS UNDER 50'	EXCELL.	GOOD	GOOD	GOOD	POOR	FAIR	GOOD TO POOR				POOR	VERY POOR	POOR	UNSATIS-FACTORY
FILLS OVER 50'	GOOD	GOOD TO FAIR	GOOD TO FAIR	FAIR	POOR	FAIR	POOR TO VERY GOOD				VERY POOR	VERY POOR	POOR	UNSATIS-FACTORY
FROST ACTION	NONE TO LOW			MEDIUM	HIGH	MEDIUM	MEDIUM	HIGH	MED. TO HIGH		MEDIUM		HIGH	MEDIUM
RANGE OF MAX. DRY DENSITY (AASHTO T-180) (PCF)	115-135	115-135	105-130	110-130	110-135	115-135	115-130	110-135	110-135	105-130	100-120	90-115	100-135	LESS THAN 100
RANGE OF OPTIMUM MOISTURE CONTENTS (AASHTO T-180X%)	9-12	8-12	8-15	8-15	9-15	6-12	9-15	8-15	10-15	10-17	12-25	14-30	11-18	———
REQUIRED COMPACTION (AASHTO T-180) (%)	92-95	92-95	92-95	92-95	92-95	92-95	92-95			≤ 95%				WASTE
COMPACTION METHODS	ROLLING WITH SMOOTH FACE TAMPING RUBBER TIRED ROLLER OR VIBRATORY COMPACTOR		TRACTOR DISKING VIBRATION	TAMPING OR RUBBER-TIRED ROLLER	TAMPING OR RUBBER-TIRED ROLLER	TAMPING OR RUBBER-TIRED ROLLER	TAMPING SHEEPFOOT ROLLER OR RUBBER-TIRED ROLLER						TAMPING OR RUBBER-TIRED ROLLER	WASTE
COMPACTION ABILITIES	GOOD WITH CLOSE CONTROL		GOOD	GOOD TO POOR	GOOD TO POOR	GOOD TO POOR	GOOD TO POOR			POOR	POOR		VERY POOR	WASTE
PUMPING ACTION	SLIGHT TO NONE						FAIR TO POOR			POOR				WASTE
BEARING VALUE	EXCELLENT TO FAIR			GOOD TO FAIR			FAIR TO POOR			POOR				WASTE
DRAINAGE	GOOD		DRAINS FREELY	FAIR TO PRACTICALLY IMPERVIOUS			FAIR TO IMPERVIOUS			POOR	IMPERVIOUS		FAIR TO IMPERVIOUS	POOR

NOTES

A-2 TO A-3 SOILS: WHEN USED AS A BASE, PLASTICITY INDEX AND LIQUID LIMIT SHOULD NOT EXCEED 6 AND 25 RESPECTIVELY. BEST FOR SOIL-CEMENT STABILIZATION. GENERALLY 8 TO 12% CEMENT BY WEIGHT WILL BE SUFFICENT.

NON-PLASTIC A-2 TO A-3, SOILS MAY REQUIRE VIBRATION FOR COMPACTION.

A-4 TO A-7 SOILS, FILLS SHOULD BE PLACED IN DRY SEASON.

A-4 SILTS, SUSCEPTIBLE TO SETTLEMENT AND EROSION.

A-5 SOILS, WHEN MICA IS PRESENT, VERY DIFFICULT TO COMPACT BECAUSE OF EXPANSION AND REBOUND.

A-6 SOILS (CLAY), WILL PUMP IN POROUS BASES FORMING CRACKS. FILLS WILL SETTLE.OVER LONG PREIODS OF TIME. HIGH BANKS IN CUTS AND FILLS VERY LIABLE TO SLIDE.

SYMBOLS	MSMT CLASSIFICATION	AASHTO CLASSIFICATION	TYPICAL GRADING	TYPICAL PHYSICALS	REMARKS FOR MSMT CLASSIFICATION
	A-3 SAND	A-1-a. A-1-b. A-3	C.S. =22% F.S. =48% SILT =20% CLAY =8% COLL.=2%	L.L.= N.P. P.I.= N.P.	SAND-53% MIN. %-#200-20% MAX. P.I.-N.P. L.L.-MUST BE N.P.
	A-2 SAND & FINES	A-1-a. A-1-b	C.S. =20% F.S. =43% SILT =19% CLAY =10% COLL.=8%	L.L.= 22 P.I.= 2	SAND-53% MIN. %-#200-20% MAX. P.I.-7 MAX. L.L.-34 MAX. (MUST HAVE L.L.)
	A-2-4 SILTY SAND	A-1-a. A-1-b	C.S. =25% F.S. =30% SILT =32% CLAY =7% COLL.=6%	L.L.= 24 P.I.= 2	SAND-53% MIN. %-#200-21% MIN.-30% MAX. P.I.-7 MAX. L.L.-34 MAX. (MAY BE N.P.)
	A-4-2 SANDY SILT	A-2-4	C.S. =23% F.S. =28% SILT =33% CLAY =10% COLL.=6%	L.L.= 25 P.I.= 3	SAND-48% MIN. %-#200-31% MIN. P.I.-7 MAX. L.L.-40 MAX. (MAY BE N.P.)
	A-2-7 CLAYEY SAND	A-2-5. A-2-6	C.S. =38% F.S. =31% SILT =15% CLAY =8% COLL.=8%	L.L.= 31 P.I.= 10	SAND-48% MIN. CLAY-29% MAX. P.I.-8-14 L.L.-40 MAX.
	A-7-2 SANDY CLAY	A-2-7	C.S. =20% F.S. =29% SILT =17% CLAY =21% COLL.=13%	L.L.= 39 P.I.= 17	SAND-48% MIN. CLAY-17%-35% P.I.-15 MIN. L.L.-30 MIN.
	A-4 SILT	A-4	C.S. =20% F.S. =22% SILT =40% CLAY =10% COLL.=8%	L.L.= 30 P.I. = 6	SAND-47% MAX. CLAY-29% MAX. P.I.-9 MAX. L.L.-40 MAX.
	A-4-7 CLAYEY SILT	A-6. A-7-5	C.S. =8% F.S. =17% SILT =40% CLAY =23% COLL.=12%	L.L.= 33 P.I.= 11	SAND-47% MAX. CLAY-25% MIN. P.I.-14 MAX. L.L.-40 MAX.
	A-7-4 SILTY CLAY	A-7-6	C.S. =18% F.S. =20% SILT =35% CLAY =12% COLL.=15%	L.L.= 39 P.I.= 15	SAND-47% MAX. CLAY-29% MAX. P.I.-15 MIN. L.L.-30 MIN.
	A-7 CLAY	A-7	C.S. =18% F.S. =22% SILT =23% CLAY =22% COLL.=15%	L.L.= 40 P.I.= 17	SAND-47% MAX. CLAY-30%-59% P.I.-15 MIN. L.L.-35 MIN.
	A-6 COLLOIDAL CLAY	A-7	C.S. =6% F.S. =7% SILT =18% CLAY =33% COLL.=36%	L.L.= 50 P.I.= 33	CLAY-60% MIN. P.I.-25 MIN. L.L.-45 MIN.
	A-5 MICA. DIATOMS. DECOMPOSED ROCK	A-5. A-6. A-7	C.S. =15% F.S. =35% SILT =30% CLAY =15% COLL.=5%	L.L.= 35 P.I.= 4	GRAD. NOT SIGNIFICANT P.I.-LOW L.L.-HIGH VISUAL INSPECTION NECESSARY TO DETERMINE TYPE
	A-8 SWAMP MUCK	A-8• (M145)	C.S. =18% F.S. =26% SILT =45% CLAY =7% COLL.=4%	L.L.= 52 P.I.= 7	ORGANIC CONTENT-4% MIN. P.I.-LOW L.L.-HIGH. WHEN OBTAINABLE
	ROCK REFUSAL				

SPECIFICATION	CATEGORY CODE ITEMS
APPROVED	Kirk G. McCallum DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT

APPROVAL • SHA REVISIONS		APPROVAL • FEDERAL HIGHWAY ADMINISTRATION	
APPROVAL	6-11-68	APPROVAL	11-1-68
REVISED	3-01-07	REVISED	12-22-09
REVISED	3-25-10	REVISED	
REVISED		REVISED	

SHA State Highway Administration

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

SOILS & SOIL-AGGREGATE MIXTURES GUIDE TO CLASSIFICATIONS

STANDARD NO. MD 000.03

AASHTO CLASSIFICATION OF SOILS AND SOIL-AGGREGATE MIXTURES

GENERAL CLASSIFICATION	GRANULAR MATERIALS (35 PERCENT OR LESS PASSING 0.075 MM (NO. 200) SIEVE)							SILT-CLAY MATERIALS (MORE THAN 35 PERCENT PASSING 0.0075 MM (NO. 200) SIEVE)			
GROUP CLASSIFICATION	A-1		A-3	A-3				A-4	A-5	A-6	A-7
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				
SIEVE ANALYSIS, PERCENT PASSING											
2.00 MM (NO. 10)	50 MAX	--	--	--	--	--	--	--	--	--	--
0.425MM (NO.40)	30 MAX	50 MAX	51 MAX	--	--	--	--	--	--	--	--
0.075MM (NO. 200)	15 MAX	25 MAX	10 MAX	35 MAX	35 MAX	35 MAX	35 MAX	36 MIN	36 MIN	36 MIN	36 MIN
CHARACTERISTICS OF FRACTION PASSING 0.425 MM (NO. 40) SIEVE											
LIQUID LIMIT	--		--	40 MAX	41 MIN	40 MAX	41 MIN	40 MAX	41 MIN	40 MAX	41 MIN
PLASTICITY INDEX	6 MAX		N.P.	10 MAX	10 MAX	11 MIN	11 MIN	10 MAX	10 MAX	11 MIN	11 MIN
USUAL TYPES OF SIGNIFICANT CONSTITUENT MATERIALS	STONE FRAGMENTS, GRAVEL AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS	
GENERAL RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR			

NOTE: PLASTICITY INDEX OF A-7-5 SUBGROUP IS EQUAL TO OR LESS THAN LL MINUS 30. PLASTICITY INDEX OF A-7-6 SUBGROUP IS GREATER THAN LL MINUS 30. SEE FIGURE M145, FIGURE.2.+

SPECIFICATION | CATEGORY CODE ITEMS

APPROVED

DIRECTOR - OFFICE OF HIGHWAY DEVELOPMENT

APPROVAL • SHA REVISIONS

APPROVAL 3-25-10 REVISED REVISED REVISED

APPROVAL • FEDERAL HIGHWAY ADMINISTRATION

APPROVAL 12-22-09 REVISED REVISED REVISED

State Highway Administration

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

AASHTO CLASSIFICATION OF SOIL AND SOIL-AGGREGATE MIXTURES

STANDARD NO. MD 000.04

BORROW REQUIREMENTS
916

BORROW CLASS	MAX. DRY DENSITY MINIMUM P.C.F. T 180	LL MAX. T 89	PI MAX. T90	GRADATION REQUIREMENTS T88	MSMT SOILS CLASSIFICATION	AASHTO SOILS CLASSIFICATION
SELECT BORROW 916	105	34	7	30% MAX. PASSING #200 SIEVE	A-2, A-3, A-2-4	A-1-a, A-1-b, A-3 A-2-4
CAPPING BORROW 916	105	34	7	30% MAX. PASSING #200 SIEVE*	A-2, A-3, A-2-4	A-1-a, A-1-b, A-3, A-2-4
MODIFIED BORROW 916	125	30	9	50% MIN. RETAINED ON #4 SIEVE	A-5 SHALL NOT BE USED	A-2-4, A-4**
COMMON BORROW 916	100	N/A	N/A	N/A	N/A	N/A

* WHEN MATERIAL HAS NO LIQUID AND PLASIC LIMIT, AND THE AMOUNT OF MATERIAL RETAINED ON THE #10 SIEVE IS LESS THAN 10% OF THE TOTAL SAMPLE MASS, THE MATERIAL MUST HAVE AT LEAST 15% PASSING THE #200 SIEVE.

** A-4 MATERIAL MUST BE A MANUFACTURED PRODUCT.

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APPROVAL 3-25-10	APPROVAL 12-22-09
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REVISED	REVISED

SHA State Highway Administration

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

BORROW REQUIREMENTS

STANDARD NO. MD 000.05