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Jonathan L. Gulliver, Highway Administrator

MassDOT
Massachusetts Department of Transportation
Highway Division

September 16, 2024

Mr. Chris Dauphinais
President
Dauphinais Concrete
P.O. Box 461
Sutton, MA 01590

Dear Mr. Dauphinais,

Your proposed cement concrete mix design formulations have been reviewed by the MassDOT Research and Materials Section (RMS) and are approved as identified on the enclosed RMS 043 Cement Concrete Mix Design Sheet, for the duration of the annual approval cycle, and will **expire on April 1, 2025**.

Approved Plant: DAUPHINAIS CONCRETE
Approved Plant Location: TAUNTON, MA
Mix Design Sheet Identification No.: 24-01-22-11-37-07

Modifications to the approved mix design formulations, including source of constituent materials, design proportions, mix type, combined aggregate system targets, paste system targets, slump targets, air content targets, and compressive strength targets are prohibited. At no point shall the water-cementitious (w/cm) ratio exceed the design target. Approval is subject to performance at the plant and project site, as well as conformance to MassDOT protocols and specifications.

Sincerely,

Jason M. Robertson

Jason M. Robertson
Director of Research and Materials

RFM
RM

JMR/rfm
Enclosures
CC: District Materials Engineer

Five Macadam Road, Hopkinton, MA 01748
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massDOT Massachusetts Department of Transportation Highway Division

Rev. 01/16/2024

2024 CEMENT CONCRETE MIX DESIGN SHEET

RMS 043

PLANT INFORMATION		MAILING ADDRESS			MIX SHEET IDENTIFICATION	
PLANT NAME	LOCATION	STREET NO. & ADDRESS	CITY/TOWN	EMAIL ADDRESS	CONTRACT	SHEET IDENTIFICATION NO.
DAUPHINAIS CONCRETE	TAUNTON, MA	P.O. Box 461	Sutton, MA 01590	chris@dauphinaisconcrete.com		24-01-22-11-37-07

CONSTITUENT MATERIALS

AGGREGATE SOURCES									PERCENT PASSING BY MASS (%)												
ID	SOURCE	LOCATION	NMAS	DESCRIPTION	SPEC.	SG	UW (PCF)	VC (%)	2 IN.	1 1/2 IN.	1 IN.	3/4 IN.	1/2 IN.	3/8 IN.	#4	#8	#16	#30	#50	#100	#200	FM
FINE	CAPE COD AGGREGATES	FALMOUTH, MA	FINE	NORMAL WEIGHT	M 6	2.68	101.4	39.3	100.0	100.0	100.0	100.0	100.0	100.0	98.9	86.1	68.5	44.7	28.4	6.9	1.5	2.67
CA1	KIMBALL SAND COMPANY	BLACKSTONE, MA	3/4 IN.	NORMAL WEIGHT - 6	M 80	2.72	106.1	37.4	100.0	100.0	100.0	90.2	32.0	3.7	1.7	1.1	1.1	1.0	1.0	0.9	0.8	6.99
CA2	KIMBALL SAND COMPANY	BLACKSTONE, MA	3/8 IN.	NORMAL WEIGHT - 8	M 80	2.70	107.4	36.2	100.0	100.0	100.0	100.0	100.0	90.4	11.2	3.1	2.7	2.0	1.5	1.0	1.0	5.88
CA3	KIMBALL SAND COMPANY	BLACKSTONE, MA	1 1/2 IN.	NORMAL WEIGHT - 4	M 80	2.74	102.4	40.0	100.0	99.4	54.6	14.4	6.2	4.1	1.7	1.0	1.0	1.0	0.8	0.7	0.5	7.76

HYDRAULIC CEMENT, SUPPLEMENTARY CEMENTITIOUS MATERIALS, PACKAGED, AND FIBER SOURCES							CHEMICAL ADMIXTURE SOURCES						
ID	SOURCE	LOCATION / PRODUCT	TYPE	DESCRIPTION	SPEC.	SG	ID	SOURCE	PRODUCT	TYPE	DESCRIPTION	SPEC.	SG
CEM	HEIDELBERG MATERIALS	CANAKKALE, TURKEY (I / II)	I / II	GENERAL / MOD. SULFATE	M 85	3.15	AD1	SIKA	SIKA AEA-14	AEA	AIR ENTRAINING	M 154	1.01
SCM1	HOLCIM	BALTIMORE, MD	SLAG	HIGH ACTIVITY (120)	M 302	2.92	AD2	SIKA	SIKAMENT 686	F	HIGH RANGE WATER REDUCING	M 194	1.05
SCM2							AD3	SIKA	SIKA VISCOCRETE-2100	F	HIGH RANGE WATER REDUCING	M 194	1.08
SCM3							AD4	SIKA	SIKA PLASTIMENT	D	WATER REDUCING AND RETARDIN	M 194	1.25
PKG							AD5	SIKA	SIKA-CNI	C	ACCELERATING	M 194	1.30
FIBER							AD6	SIKA	LIGHTCRETE POWDER	CLSM	CLSM ENHANCING	TDS	1.00

MIX DESIGN FORMULATION

MIX IDENTIFICATION NO.			F'_c	NMAS	SLUMP	AC	W/CM	PC	AGGREGATE (LBS.)				CEMENT, SCM, PACKAGED, AND FIBER (LBS.)						TOTAL WATER (GAL.) AND CHEMICAL ADMIXTURES (OZ						YIELD
MASSDOT	PRODUCER	MIX DESIGN TYPE	(PSI)	(IN.)	(IN.)	(%)	RATIO	(%)	FINE	CA1	CA2	CA3	CEM	SCM1	SCM2	SCM3	PKG	FIBER	W1	AD1	AD2	AD3	AD4	AD5	AD6	(CF)
24-01-22-11-37-07-01	MHDCDFEX	CLSM MANUAL EXC	50	FINE	8.00	30.0	6.51	20.2	2250.0				50.0						39.0						1.0	27.0
24-01-22-11-37-07-02	MHDCDFNOEX	CLSM MECH EXC	200	FINE	8.00	25.0	1.59	22.6	2360.0				200.0						38.0						1.0	27.0
24-01-22-11-37-07-03	MHDCDFS	CLSM NON-EXC	325	FINE	8.00	25.0	0.98	25.0	2250.0				325.0						38.0						1.0	27.0
24-01-22-11-37-07-04	3034SMHD	CONVENTIONAL	3000	3/4	5.00	6.0	0.53	26.3	1325.0	1250.0	500.0		390.0	130.0					33.0	1.0	20.0					27.0
24-01-22-11-37-07-05	3015SMHD	CONVENTIONAL	3000	1 1/2	5.00	5.5	0.53	25.4	1265.0	710.0	450.0	720.0	375.0	125.0					32.0	1.0	20.0					27.0
24-01-22-11-37-07-06	4038SMHD	CONVENTIONAL	4000	3/8	5.00	7.5	0.45	30.3	1170.0		1650.0		495.0	165.0					35.6	2.0	26.0					27.0
24-01-22-11-37-07-07	4034SMHD	CONVENTIONAL	4000	3/4	5.00	6.0	0.45	28.5	1220.0	1250.0	500.0		465.0	155.0					33.5	1.5	25.0					27.0
24-01-22-11-37-07-08	4034SWMHD	SIDEWALK	4000	3/4	5.00	7.0	0.45	28.1	1200.0	1250.0	500.0		458.0	153.0					33.0	1.5	25.0					27.0
24-01-22-11-37-07-09	4034SMHDT	TREMIE	4000	3/4	8.00	6.0	0.44	30.0	1200.0	1250.0	450.0		493.0	165.0					35.0	2.0	40.0		14.0			27.0
24-01-22-11-37-07-10	4038SMHDT	TREMIE	4000	3/8	8.00	7.0	0.44	30.9	1200.0		1610.0		510.0	170.0					36.0	2.0	40.0		14.0			27.0
24-01-22-11-37-07-11	4015SMHD	CONVENTIONAL	4000	1 1/2	5.00	5.5	0.45	27.7	1190.0	700.0	450.0	700.0	450.0	150.0					32.7	1.0	24.0					27.0
24-01-22-11-37-07-12	5034SMHD	CONVENTIONAL	5000	3/4	5.00	6.0	0.40	30.3	1140.0	1250.0	500.0		528.0	177.0					33.8	2.5	28.0					27.0
24-01-22-11-37-07-13	HPSMHD	HP	5000	3/4	6.00	6.5	0.39	29.2	1170.0	1250.0	500.0		411.0	274.0					32.0	2.5		24.0	14.0	384.0		27.0
24-01-22-11-37-07-14	HP38SMHD	HP	5000	3/8	6.00	6.5	0.38	29.7	1240.0		1650.0		426.0	284.0					32.0	3.0		24.0	14.0	384.0		27.0
24-01-22-11-37-07-15	2538SMHD	CONVENTIONAL	2500	3/8	5.00	7.5	0.55	26.8	1375.0		1600.0		390.0	130.0					34.0	1.0	20.0					27.0

COMBINED AGGREGATE SYSTEM, PASTE SYSTEM, AND UNIT WEIGHT

MIX IDENTIFICATION NUMBERS		PERCENT BY MASS PASSING (%)													TARANTULA	SHILSTONE WF-CF	SCM1	SCM2	SCM3	EPC	VC	PC/VC	UW
MASSDOT	PRODUCER	2 IN.	1 1/2 IN.	1 IN.	3/4 IN.	1/2 IN.	3/8 IN.	#4	#8	#16	#30	#50	#100	#200	CURVE	ZONE	(%)	(%)	(%)	(%)	(%)	RATIO	(PCF)
24-01-22-11-37-07-01	MHDCDFEX	100.0	100.0	100.0	100.0	100.0	100.0	98.9	86.1	68.5	44.7	28.4	6.9	1.5	OUTSIDE LIMITS	IV: EXCESSIVE FINES	0.0	0.0	0.0	30.6	19.6	1.03	97.1
24-01-22-11-37-07-02	MHDCDFNOEX	100.0	100.0	100.0	100.0	100.0	100.0	98.9	86.1	68.5	44.7	28.4	6.9	1.5	OUTSIDE LIMITS	IV: EXCESSIVE FINES	0.0	0.0	0.0	27.0	20.6	1.10	106.6
24-01-22-11-37-07-03	MHDCDFS	100.0	100.0	100.0	100.0	100.0	100.0	98.9	86.1	68.5	44.7	28.4	6.9	1.5	OUTSIDE LIMITS	IV: EXCESSIVE FINES	0.0	0.0	0.0	30.4	19.6	1.28	107.3
24-01-22-11-37-07-04	3034SMHD	100.0	100.0	100.0	96.0	72.4	59.3	45.1	38.1	30.4	20.0	12.9	3.5	1.1	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	25.0	0.0	0.0	6.6	25.7	1.02	143.3
24-01-22-11-37-07-05	3015SMHD	100.0	99.9	89.6	78.2	63.2	54.9	42.2	35.6	28.4	18.7	12.0	3.3	1.0	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	25.0	0.0	0.0	4.3	26.6	0.95	144.8
24-01-22-11-37-07-06	4038SMHD	100.0	100.0	100.0	100.0	100.0	94.4	47.6	37.5	30.0	19.7	12.7	3.4	1.2	OUTSIDE LIMITS	III: OPTIMUM (< 3/4 IN. NMAS)	25.0	0.0	0.0	14.5	23.3	1.30	139.7
24-01-22-11-37-07-07	4034SMHD	100.0	100.0	100.0	95.9	71.4	57.9	43.2	36.4	29.1	19.1	12.3	3.4	1.1	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	25.0	0.0	0.0	9.6	24.9	1.14	143.4
24-01-22-11-37-07-08	4034SWMHD	100.0	100.0	100.0	95.8	71.2	57.6	42.8	36.0	28.8	18.9	12.2	3.4	1.1	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	25.0	0.0	0.0	10.4	24.7	1.14	142.0
24-01-22-11-37-07-09	4034SMHDT	100.0	100.0	100.0	95.8	70.7	57.0	43.4	36.6	29.2	19.2	12.4	3.4	1.1	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	25.1	0.0	0.0	11.7	24.3	1.23	142.8
24-01-22-11-37-07-10	4038SMHDT	100.0	100.0	100.0	100.0	100.0	94.5	48.7	38.5	30.8	20.2	13.0	3.5	1.2	OUTSIDE LIMITS	III: OPTIMUM (< 3/4 IN. NMAS)	25.0	0.0	0.0	14.6	23.3	1.33	140.4
24-01-22-11-37-07-11	4015SMHD	100.0	99.9	89.5	78.0	62.7	54.3	41.2	34.6	27.7	18.3	11.8	3.2	1.0	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	25.0	0.0	0.0	7.4	25.8	1.07	144.9
24-01-22-11-37-07-12	5034SMHD	100.0	100.0	100.0	95.8	70.6	56.7	41.7	35.0	28.0	18.4	11.9	3.3	1.1	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	25.1	0.0	0.0	12.1	24.2	1.25	143.7
24-01-22-11-37-07-13	HPSMHD	100.0	100.0	100.0	95.8	70.9	57.1	42.3	35.5	28.4	18.7	12.1	3.3	1.1	OUTSIDE LIMITS	II: OPTIMUM (3/4 - 2 IN. NMAS)	40.0	0.0	0.0	11.3	24.4	1.20	143.5
24-01-22-11-37-07-14	HP38SMHD	100.0	100.0	100.0	100.0	100.0	94.5	48.8	38.7	30.9	20.3	13.0	3.5	1.2	OUTSIDE LIMITS	III: OPTIMUM (< 3/4 IN. NMAS)	40.0	0.0	0.0	12.2	24.0	1.24	143.2
24-01-22-11-37-07-15	2538SMHD	100.0	100.0	100.0	100.0	100.0	94.8	51.7	41.5	33.1	21.7	13.9	3.7	1.2	OUTSIDE LIMITS	III: OPTIMUM (< 3/4 IN. NMAS)	25.0	0.0	0.0	9.6	24.7	1.09	139.9

We agree to produce cement concrete mix designs per the precise proportions, quantities, types, and sources of constituent materials identified on the approved RMS 043 Cement Concrete Mix Design Sheet for MassDOT construction contracts.

Mr. Chris Dauphinais	President	SIGNATURE IN PRODUCER FILE	9/16/2024
NAME	*TITLE*	*AUTHORIZED SIGNATURE*	*DATE*