

ODESSA

TYPE C MIX (NO RAP)

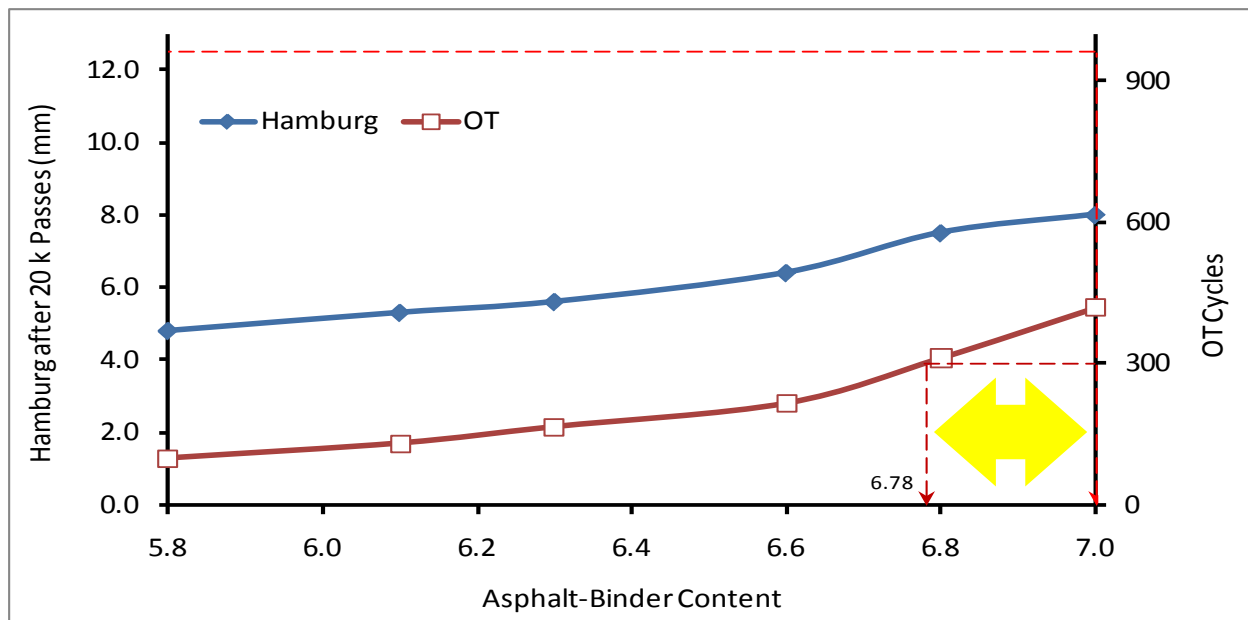
Asphalt-binder: PG 70-22 (with Limestone aggregates)
Aggregate-blend: 21% C-rock + 30% D-rock + 17% F-rock + 32% screenings
RAP & anti-strip: None

Original OAC design: 5.8% @ 96% TGC lab density

Summary of Lab Results

Asphalt Content	Corresponding TGC Lab Density	VMA	Hamburg (after 20 000 passes)	Overlay (cycles)
5.8%	96.0%	16.9	4.8 mm	98
6.1%	96.5%	17.0	5.3 mm	130
6.3%	97.0%	17.0	5.6 mm	165
6.6%	97.5%	17.1	6.4 mm	215
6.8%	98.0%	17.2	7.5 mm	311

(All Hamburg and Overlay samples were molded and tested @ $7 \pm 1\%$ AV)



Proposed modifications in order of **PRIORITY**

- 1) Go with 6.6% OAC corresponding to 97.5% TGC lab density.
- 2) Re-design as Item 341 Type C and Type D
- 3) Change to PG 64-22.
- 4) Change aggregate gradation – Reduce the C-rock & increase Type F/screenings.

Type C Original

MATERIAL CODE:		MIX TYPE:	ITEM344_SP_C_Surface
MATERIAL NAME:			
PRODUCER:	CSA Materials, Inc.		
AREA ENGINEER:	Dan Dalegar, P.E.	PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
		DIST. FROM CL:	
CONTRACTOR DESIGN # :		SP-C-115-09 01	

	BIN FRACTIONS															Dry Rodded Unit Weight of Coarse Agg. (pcf)								
	Bin No.1		Bin No.2		Bin No.3		Bin No.4		Bin No.5		Bin No.6		Bin No.7											
Aggregate Source:	CSA		CSA		CSA		CSA								1.218									
Aggregate Pit:	Turner		Turner		Turner		Turner																	
Aggregate Number:																								
Sample ID:	Course-C		Ty-D		Ty-FF		Screenings								Combined Gradation									
Rap?:																								
															Total Bin									
Individual Bin (%):	21.0	Percent	30.0	Percent	17.0	Percent	32.0	Percent		Percent		Percent		Percent	100.0%	Lower & Upper Specification Limits			Restricted Zone			Individual % Retained	Cumulative % Retained	Sieve Size
Sieve Size:	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum. % Passing	Low er	Upper	Within Spec's	Lower	Upper	Within Spec's			
1"	100.0	21.0	100.0	30.0	100.0	17.0	100.0	32.0							100.0	100.0	100.0	Yes				0.0	0.0	1"
3/4"	100.0	21.0	100.0	30.0	100.0	17.0	100.0	32.0							100.0	98.0	100.0	Yes				0.0	0.0	3/4"
1/2"	55.5	11.7	100.0	30.0	100.0	17.0	100.0	32.0							90.7	90.0	100.0	Yes				9.3	9.3	1/2"
3/8"	6.5	1.4	96.7	29.0	100.0	17.0	100.0	32.0							79.4	58.0	90.0	Yes				11.3	20.6	3/8"
No. 4	0.3	0.1	6.1	1.8	79.7	13.5	97.0	31.0							46.5	28.0	90.0	Yes				32.9	53.5	No. 4
No. 8	0.3	0.1	3.2	1.0	4.0	0.7	83.1	26.6							28.3	28.0	58.0	Yes	39.1	39.1	Yes	18.2	71.7	No. 8
No. 16	0.2	0.0	3.0	0.9	3.7	0.6	55.7	17.8							19.4	2.0	58.0	Yes	25.6	31.6	Yes	8.9	80.6	No. 16
No. 30	0.2	0.0	2.9	0.9	3.6	0.6	42.3	13.5							15.1	2.0	58.0	Yes	19.1	23.1	Yes	4.3	84.9	No. 30
No. 50	0.2	0.0	2.8	0.8	3.5	0.6	32.5	10.4							11.9	2.0	58.0	Yes	15.5	15.5	Yes	3.2	88.1	No. 50
No. 200	0.2	0.0	2.4	0.7	3.3	0.6	18.3	5.9							7.2	2.0	10.0	Yes				4.7	92.8	No. 200

Not within specifications # Not cumulative

Lift Thickness, in:	
Asphalt Source & Grade:	Alon PG 70-22
Binder Percent, (%):	5.8
Asphalt Spec. Grav.:	1.034
Antistripping Agent:	None
Percent, (%):	

Remarks:

Target Density, %	96.0
Number of Gyration:	75



TEST SPECIMENS							Mixture Evaluation @ Optimum Asphalt Content			
Asphalt Content (%)	Specific Gravity Of Specimen (Ga)	Maximum Specific Gravity (Gr)	Effective Gravity (Ge)	Theo. Max. Specific Gravity (Gt)	Density from Gt (Percent)	VMA (Percent)	Indirect Tensile Strength (psi)	Hamburg Wheel Tracking Test		Overlay Tester Min. Number of Cycles
								Number of cycles	Rut depth (mm)	
5.0	2.269	2.415	2.598	2.411	94.1	16.9	148.9	20,000	6.0	
5.5	2.281	2.396	2.595	2.394	95.3	16.9				
6.0	2.291	2.378	2.593	2.378	96.4	16.9				
6.5	2.300	2.361	2.592	2.361	97.4	17.1				
7.0	2.307	2.340	2.586	2.345	98.4	17.2				

Effective Specific Gravity:	2.593
Optimum Asphalt Content :	5.8
VMA @ Optimum AC:	16.9
VFA @ Optimum AC:	76.4
Interpolated Values	
Specific Gravity (Ga):	2.288
Max. Specific Gravity (Gr):	2.384
Theo. Max. Specific Gravity (Gt):	2.383
Dust/Asphalt Ratio:	1.2

Estimated Percent of Stripping, %	0
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STONE-ON-STONE CONTACT

VCA(CA, calc.)	99.2251
VCA(MIX, calc.)	34.8779

MIXTURE DENSIFICATION			
Sample	A	B	Density (%)
Gr	2.381	2.381	
Ga	2.288	2.284	
Height @ Nini	145.6	145.3	75.4
Height @ Ndes	114.8	114.5	95.7
Height @ Nmax	114.4	114.1	96.0

Remarks:

Molding Temp = 275 to 285F. Rice run 7 min. Mold weight = 4500 Hamburg weight 2350g.