

## FORT WORTH

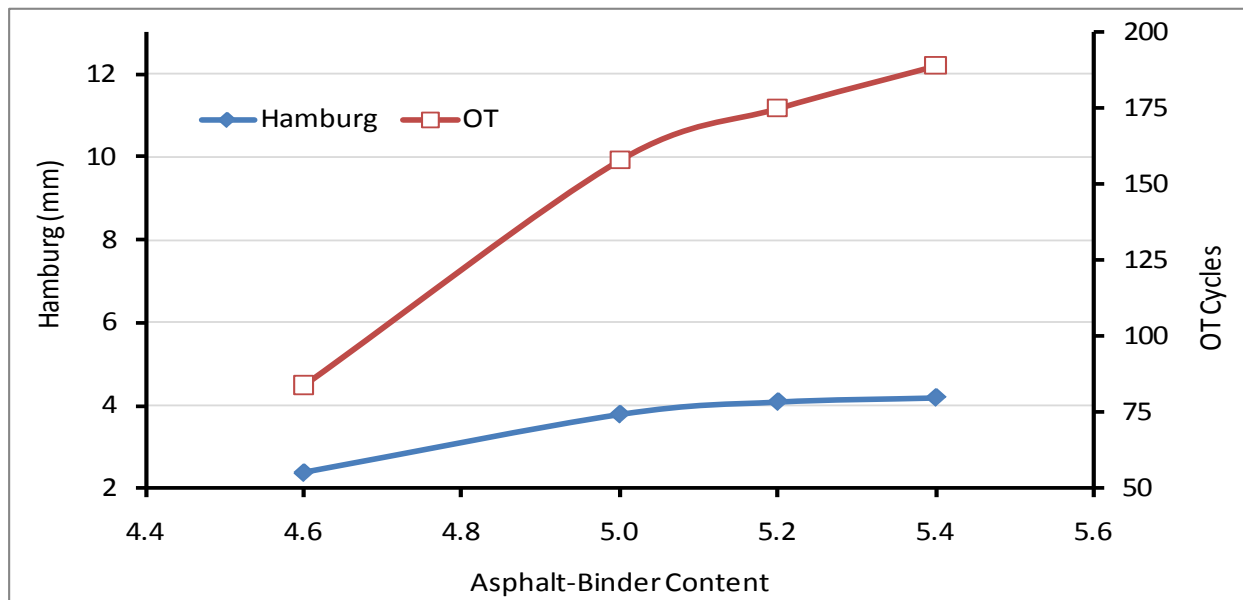
### TYPE C MIX, WITH 15% RAP

Asphalt-binder: PG 70-22 (with Granite aggregates)  
Aggregate-blend: 37% C-rock + 19% D-rock + 29% Man. Sand + 15% RAP (fine)  
RAP: 15% Fine  
Anti-strip: Akzo Nobel 2912 (1%)

Original OAC design: 4.6% @ 96% TGC density  
Ignition Oven test: **4.3%** asphalt-binder content

#### Summary of Lab Results

OAC	Corresponding TGC Lab Density	VMA (≥ 14)	Hamburg (after 20 000 passes) (≤ 12.5 mm after 15 k)	Overlay (cycles)	Comment
4.6%	96.0%	15.1	2.8 mm	48	Plant-mix
4.6%	96.0%	15.1	2.4 mm	84	Raw materials molded in TTI lab
5.0%	97.0%	15.0	3.8 mm	158	
5.2%	97.5%	15.0	4.1 mm	175	
5.4%	98.0%	15.0	4.2 mm	189	



#### Proposed modifications in order of **PRIORITY**

- 1) Go with 5.2% OAC corresponding to 97.5% TGC lab density.
- 2) Change to PG 64-22.
- 3) Change aggregate gradation - **reduce RAP & C-Rock**; & **increase D-Rock & M. Sand**.

# Type C Original

COUNTY:		SPEC YEAR:	2004
SAMPLED BY:		SPEC ITEM:	
SAMPLE LOCATION:		SPECIAL PROVISION:	None
MATERIAL CODE:	0341CM0000	MIX TYPE:	ITEM341_C_Coarse_Surface
MATERIAL NAME: ITEM 341 COMPLETE MIX QCQA ALL MIX TYPES			
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
		DIST. FROM CL:	
		CONTRACTOR DESIGN # :	2020-0609-70A

	BIN FRACTIONS																								
	Bin No.1		Bin No.2		Bin No.3		Bin No.4		Bin No.5		Bin No.6		Bin No.7												
Aggregate Source:	Martin Marietta		TXI		TXI				RAP						Combined Gradation										
Aggregate Pit:	mill creek		Mill Creek		Mill Creek				IH35																
Aggregate Number:																									
Sample ID:	C Rock		D Rock		Man Sand				RAP																
Recycled Material?:									Yes						Total Bin										
Asphalt%:									6.8																
Individual Bin (%):	37.0	Percent	19.0	Percent	29.0	Percent		Percent	15.0	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	37.0	100.0	19.0	100.0	29.0			100.0	15.0					100.0	100.0	100.0	Yes				0.0	0.0	1"	
3/4"	100.0	37.0	100.0	19.0	100.0	29.0			100.0	15.0					100.0	95.0	100.0	Yes				0.0	0.0	3/4"	
3/8"	41.9	15.5	98.0	18.6	100.0	29.0			98.9	14.8					78.0	70.0	85.0	Yes				22.0	22.0	3/8"	
No. 4	12.1	4.5	43.0	8.2	99.1	28.7			80.4	12.1					53.4	43.0	63.0	Yes				24.5	46.6	No. 4	
No. 8	4.1	1.5	3.3	0.6	87.1	25.3			58.1	8.7					36.1	32.0	44.0	Yes				17.3	63.9	No. 8	
No. 30	2.0	0.7	0.6	0.1	49.3	14.3			36.9	5.5					20.7	14.0	28.0	Yes				15.4	79.3	No. 30	
No. 50	1.5	0.6	0.4	0.1	36.4	10.6			29.1	4.4					15.6	7.0	21.0	Yes				5.1	84.4	No. 50	
No. 200	0.9	0.3	0.2	0.0	7.2	2.1			13.5	2.0					4.5	2.0	7.0	Yes				11.1	95.5	No. 200	

# Not within specifications # Not cumulative

Lift Thickness, in:	
Asphalt Source & Grade:	Jebro 70-22
Binder Percent, (%):	4.6
Asphalt Spec. Grav.:	1.022
Antistripping Agent:	Akzo Nobel 2912
Percent, (%):	1
Remarks:	
Molding Temp. 275°	

Target Density, %:	96.0
Number of Gyration:	



								Mixture Evaluation @ Optimum Asphalt Content			
TEST SPECIMENS								Indirect Tensile Strength (psi)	Hamburg Wheel Tracking Test		Overlay Tester Min. Number of Cycles
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)	Number of cycles		Rut depth (mm)		
1	3.5	2.396	2.580	2.731	2.583	92.8	15.4				
2	4.0	2.411	2.569	2.742	2.563	94.1	15.4				
3	4.5	2.431	2.545	2.737	2.543	95.6	15.1				
4	5.0	2.447	2.516	2.726	2.523	97.0	15.0				
5	5.5	2.460	2.505	2.736	2.504	98.3	15.0				

Effective Specific Gravity:	2.734
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Estimated Percent of Stripping, %:	0
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Optimum Asphalt Content :	4.6
VMA @ Optimum AC:	15.1

Interpolated Values	
Specific Gravity (Ga):	2.436
Max. Specific Gravity (Gr):	2.537
Theo. Max. Specific Gravity (Gt):	2.537

Remarks:

3.5% Virgin AC

