





2200 S. Avenida Los Reyes, Tucson, AZ 85748  
 Main (520) 395-9479  
 Fax (520) 495-5139  
 www.millerohern.com  
 ROC 264847

## SUBMITTAL TRANSMITTAL

### RICHEY FUEL TANK REPLACEMENT

June 4, 2011

To: **M3 ENGINEERING AND TECHNOLOGY**  
 2051 W. Sunset Road, Suite 101  
 Tucson, Arizona 85704

From: **Miller O'Hern Construction, LLC**  
 2200 S. Avenida Los Reyes  
 Tucson, Arizona 85748

Subcontractor: **Strunk Excavating**  
 Manufacturer:  
 Supplier: **Calportland**

Specification Section: **None**

Submittal Purpose:  For Approval  
 For Information Only

Submittal Type	<input checked="" type="checkbox"/> Product Data	Number of Copies
	<input type="checkbox"/> Shop Drawing	6
	<input type="checkbox"/> Sample	

Remarks:

The contract documents do not specify the asphalt paving mix design. The design submitted is Pima County Standard Specification, Section 406.

Signature



May 24, 2011

Strunk Excavating

Project: Richey Blvd tank removal  
Dodge Blvd & Fort Lowell

RE: Asphaltic Concrete Mix Design  
PAG No: 2 Arterial Commodity Code- 406650  
PAB ABC Commodity Code - 90001129

MILLER O'HERN CONSTRUCTION has reviewed this submittal and believes it to be in substantial compliance with the contract documents.

By: David J. Miller

Date: 6-3-11

Miller O'Hern Construction, LLC 520-395-9479

*No specification in the Project documents.*

Gentlemen:

Please find attached the referenced asphaltic concrete mix design. This mix was designed to meet the requirements of **Section 406 of the City of Tucson / Pima County Standard Specifications for Public Improvements, 2003 Edition.**

The PG 70-10 oil will be supplied by Western Refining and the lime will come from Chemical Lime Company.

This asphaltic concrete will be produced at our Plant No. 770, located at Orange Grove and I-10. The crushing, screening and general processing of the mineral aggregate is the same as when this mix was designed.

Should you have any question regarding this submittal we would be pleased to discuss them with you.

Respectfully,

CalPortland

*Tom Romero / emy*

Tom Romero  
Quality Control Manager

Calportland 3755 N Business Center Drive Tucson, AZ 85705 Office 520-744-3222 Fax 520-744-4394



**Western Technologies Inc.**  
 The Quality People  
 Since 1953

3480 South Dodge Boulevard  
 Tucson, AZ 85713  
 (520) 748-2262

**PHYSICAL PROPERTIES OF SOILS & AGGREGATES**

Client **CALPORTLAND**  
 0601 N. CASA GRANDE HWY  
 TUCSON, AZ 85743

Date of Report **02-23-11**  
 Job No. **2940JH021**  
 Event / Invoice No. **V821-064**  
 Authorized by **TOM ROMERO**  
 Sampled by **CLIENT**  
 Submitted by **CLIENT**

Lab No. **02**  
 Date **02-02-11**  
 Date **02-02-11**  
 Date **02-02-11**

Project **QUALITY CONTROL**  
 Contractor **-**  
 Type / Use of Material **AGGREGATE BASE COURSE WITH LIME\***  
 Sample Source / Location **STOCKPILE PLANT**  
 Testing Authorized: **SIEVE ANALYSIS, PLASTICITY INDEX, FRACTURED FACES, LA ABRASION, P.M. MINIMUM\***  
 Special Instructions:

Location **VARIOUS, TUCSON, AZ**  
 Arch. / Engr. **-**  
 Supplier / Source **CPD/ORANGE GROVE PLANT (111R)**  
 Source / Location Desig. By **CLIENT**  
 Date **02-02-11**

**TEST RESULTS**

SIEVE ANALYSIS : AZ 201 FINER THAN NO. 200			LABORATORY COMPACTION CHARACTERISTICS : ARIE Z23		METHOD A		
SIEVE	ACCUMULATIVE % PASSING	SPECIFICATION		SAMPLE PREPARATION: <input type="checkbox"/> WET <input checked="" type="checkbox"/> DRY RAMMER USED: <input checked="" type="checkbox"/> 2 IN. CIRCULAR FACE <input type="checkbox"/> OTHER <input type="checkbox"/> MECHANICAL <input checked="" type="checkbox"/> MANUAL			
1"	100	100		PROJECT PROCTOR ID: 1 MAXIMUM DENSITY, LB/FT <sup>3</sup> → 121.2 OPTIMUM MOISTURE CONTENT, % → 12.5  OVERSIZE AGGREGATE : ASSUMED BULK SPECIFIC GRAVITY: 2.65 ASSUMED ABSORPTION, % : 1.0 % OVERSIZE IN LAB SAMPLE : 4.9 2.65			
3/4"	97	90-100					
1/2"	86	PC/COT					
3/8"	77						
1/4"	63	45-75					
No.4	57						
8	44						
10	41						
16	32						
30	23						
40	20						
50	17						
100	12						
200	6.1	0-10					
TEST PROCEDURE			RESULT	SPECS	TEST PROCEDURE	RESULT	SPECS
LIQUID & PLASTIC PROPERTIES (ASTM D153, 07)					RESISTANCE TO DEGRADATION OF SMALL-SIZE COARSE AGGREGATES BY ABRASION (ASTM D421)		
METHOD B			25		GRADING B 100 REV. % LOSS →	7	3 MAX.
ESTIMATED % RETAINED ON NO. 40			23		GRADING E 500 REV. % LOSS →	23	49 MAX.
PLASTICITY INDEX →			2	3 MAX.			
MOISTURE CONTENT :					SPECIFIC GRAVITY :		
PORTION TREATED					MAX. PARTICLE SIZE, IN.		
% DRY WEIGHT →					SPECIFIC GRAVITY @ 20°C		
EXPANSION / COMPRESSION PROPERTIES OF COHESIVE SOIL :					pH DETERMINATION (ASTM D4972)		
WT PROCEDURE			0.0			PH →	8.8
<input checked="" type="checkbox"/> EXPANSION <input type="checkbox"/> COMPRESSION, % →					SOLUBLE SALTS :	PPM →	
MAXIMUM SWELL PRESSURE, KSF →					MINIMUM RESISTIVITY : A2 214	OHM-CM →	2230
SUACHARGE, KSF 0.1							
INITIAL WATER CONTENT, % 0.2							
DRY DENSITY, PCF 116.5							
(COMPACTED TO APPROX. 98% OF ASTM D998 METHOD A)							
SOIL CLASSIFICATION :			GROUP SYMBOL :				
			NAME :				

Comments **FRACTURED FACES (AZ 212): 82% WITH 1 FACE (SPEC. 30% MIN. 1 FACE).**  
**\* VARIOUS \*\* RESISTIVITY, MOISTURE-DENSITY RELATIONSHIP, REMOLDED SWELL.**

Copies to: CLIENT (2)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OBSERVED ON SAMPLE(S) TESTED AT THE TIME AND PLACE STATED. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION REGARDING OR IMPLYING AND HAS NOT OBTAINED INFORMATION REGARDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY JON C. HOFFMAN

(PROD. COPY OF RPT)



**Western Technologies Inc.**  
The Quality People  
Since 1955

3737 East Broadway Road  
Phoenix, Arizona 85040-2921  
(602) 437-3737 • fax 470-1341

May 5, 2010

CalPortland  
6601 N Casa Grande HWY  
Tucson, Arizona 85743

Attn: Mr. Tom Romero  
Quality Control Manager

COMMODITY CODE 406 5 5 0

Re: PAG No. 2 Asphalt Concrete Mix Design  
Arterial/Collector and Major Streets  
Various Projects

Job No. 2140JL016  
Lab No. D016-03AA

As authorized by CalPortland (CP), Western Technologies Inc. (WT) has completed a PAG No. 2 asphalt concrete mix design for various projects. This report describes the work performed and presents the results obtained.

The asphalt concrete mix design was prepared in accordance with Section 406 of the City of Tucson / Pima County Standard Specifications for Public Improvements.

The six mineral aggregate stockpiles used within this mix design were sampled by CP personnel and delivered to WT's Phoenix laboratory. Samples of the asphalt cement and mineral admixture were submitted to WT's Phoenix laboratory by the suppliers. The material sources are listed in the table below.

MATERIAL	SOURCE/SUPPLIER	SOURCE LOCATION
MINERAL AGGREGATE	80% Orange Grove Asphalt Plant & 20% AZ Portland Cement Co. Pk/ CP	TUCSON, ARIZONA
PG 70-10 ASPHALT CEMENT	WESTERN REFINING	TUCSON ASPHALT TERMINAL
MINERAL ADMIXTURE - LIME	TYPE N HYDRATED LIME / CHEMICAL LIME COMPANY	PEACH SPRINGS, ARIZONA

The mineral admixture was mixed with the mineral aggregates using the pug mill method (wet preparation) and 3 percent water by weight of dry aggregate.

The laboratory mixing and compaction temperature ranges recommended by Western Refining for the PG 70-10 asphalt cement were 323°F to 335°F and 300°F to 310°F, respectively. Laboratory mixing and compaction temperatures used in the mix design were 330°F and 305°F, respectively. A copy of the temperature-viscosity graph is attached. Actual mixing and compaction temperatures may require adjustment to meet field conditions. A compaction test strip is recommended.

MA:REPORTS/CP-D016-03AA

CalPortland  
Job No. 2140JL016

Results of our testing are presented in the attached mix design summary and supporting laboratory documents.

The asphalt concrete mix design presented herein is based upon aggregate samples provided by CP. Mix design results are representative of overall material only to the extent that the samples are representative of the aggregate quality and uniformity obtained during production and handling operations, which are the client's responsibilities. Normal variations from the mix design results due to normal plant, crushing, and handling operations are expected. However, should the source or physical characteristics of the aggregates substantially change, the development of a new or revised mix design is recommended. The mix design set forth in this report may be relied upon only for the referenced project or application, and is subject to timely verification.

If you should have any questions regarding this information, or if we may be of any additional assistance, please call us at (802) 437-3737.

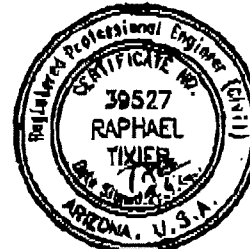
Sincerely,  
WESTERN TECHNOLOGIES INC.



Phillip D. Feliz, S.E.T.  
Senior Materials Principal

Attachments

Copies to: Client (3)



Expires 09/30/12

Raphael Tixier, Ph.D., P.E.  
Senior Materials Engineer



**Asphalt Design Summary**

(15 Blow Marshall)

Western Technologies Inc.

WT Job/Lab No.: 2140JL016 / D016-03AA	Date: 05-05-10
Client: CalPortland	Mix Type: PAG No. 7 (Arterial/Collector & Major Streets)
Project Name: Various	Source of Aggregate: CPC Orange Grove Plant
Project No.: Various	Asphalt Source: Western Refining
	Asphalt Grade: PG 70-10
Project Loc.: Various	Type of Admix.: Type N Hydrated Lime (Wet Mixed)

Composite Aggregate Gradation			
Aggregate	Lab No.	Percentage w/ Admix	
M.A. Fines	D016-03A	23.76	
Washed M.A. Fines	D016-03B	9.90	
Bedding Sand	D016-03C	9.90	
Concrete Sand	D016-03D	9.90	
3/8" M.A. (#20)	D016-03E	14.25	
5/8" M.A. (#30)	D016-03F	30.49	
Type N Hydrated Lime	Lime	0.99	
Sieve (US/ram)	Composite w/ Admix	Specs w/ Admix	Composite w/ Admix
2" / 50	100		100
1.25" / 31.5 (#12.5)	100		100
3/4" / 19	100	100	100
1/2" / 12.5	97	99-100	97
3/8" / 9.5	84	70-85	84
1/4" / 6.3	67		60
#4 / 4.75	60	54-68	61
#8 / 2.36	48	44-53	46
#10 / 2.00	42		42
#16 / 1.18	32		33
#30 / .600	21		22
#40 / .425	19	13-23	18
#50 / .300	13		14
#100 / .150	8		9
#200 / .075	5.6	3-8	6.3

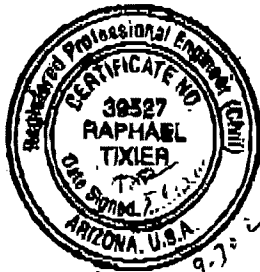
Immersion Compression Test (ASTM D2922)			
Dry (PSI)	Wet (PSI)	% Retained	% Asphalt
544.8	483.3	71.4%	5.6
Spec	150 Min	60 Min	

<b>Selected % Asphalt:</b>	<b>5.6</b>
Mix Designation:	PAG No. 7 (Arterial/Collector & Major Streets)
Asphalt Grade:	PG 70-10
Asphalt Source:	Western Refining
Admix Source:	Type N Hydrated Lime
Lab Mixing Temperature:	330°F
Lab Compaction Temperature:	305°F

Design Data at Selected % Asphalt			
Property	Design	Spec.	
Percent of Asphalt	5.6		
Bulk Specific Gravity	2.148		
Bulk Specific Density (toppd)	2243		
Bulk Specific Density (PCP)	140.1		
Theor. Max. Sp. Gr. (Gmm)	2.377		
Stability (Lbs)	4017	2908 Min	
Flow (0.01 in.)	12	8-16	
Percent Air Voids	6.4	5.3-6.7	
Percent VMA	16.2	15.0 Min	
Percent Voids Filled	66.4		
Percent Effective Asphalt	4.890		
Dust to Eff. Asphalt Ratio	1.33		
Effective Sp. Gr. (w/ Admix)	2.820		

Aggregate / Admix Properties				
Property	Coarse	Fine	Comb of Adm.	Spec
Bulk (Dry) Sp. Gravity	2.550	2.528	2.531	2.35-2.83
"SSD" Sp. Gravity	2.595	2.581	2.582	
Apparent Sp. Gravity	2.649	2.676	2.668	
Water Absorption (%)	1.78	2.73	2.04	0-1.3
Admixure Sp. Gravity	2.300	Asphalt Sp. Gravity:		1.0224
Sand Equivalent value:			57	50 Min
Ret. No. 8 One or More Fractured Faces (%)			100	50 Min
Ret. No. 8 Two or More Fractured Faces (%)			98	—
Uncompacted Voids (%)			—	—
Asphalt Absorbed into Dry Aggregate (%)			0.77	1.5 Max
L.A. Abrasion @ 100 Rev. (%)			94	8 Max
L.A. Abrasion @ 500 Rev. (%)			21	40 Max

\*Historical



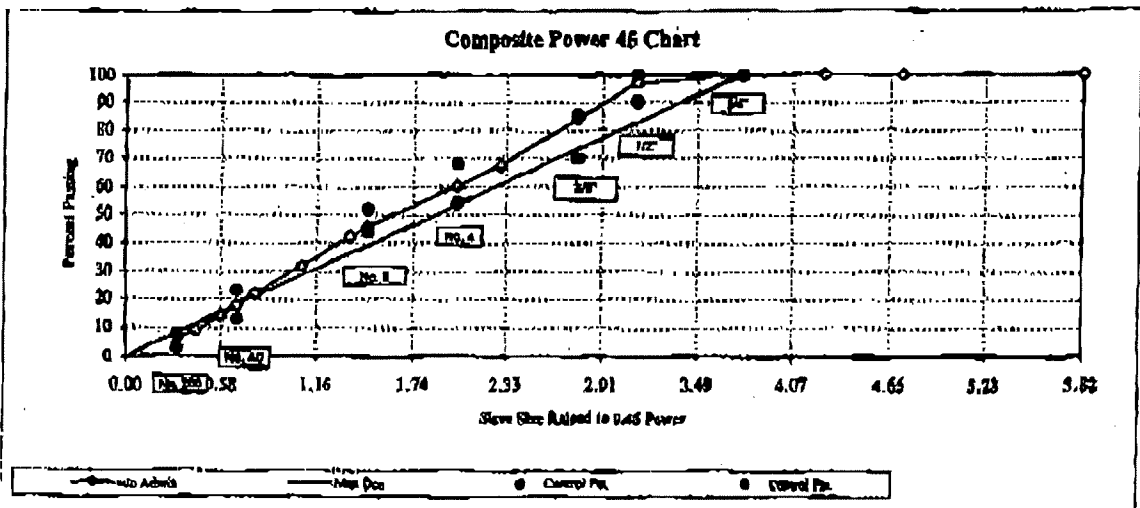
**Aggregate Composite Grading - Stockpiles**

Western Technologies Inc.

WT Job / Lab No.: 2140JL016 / D016-03AA	Date: 05-08-10
Client: CalPortland	Mix Type: PAC No. 2 (Artisan/Collector & Major Streets)
Project Name: Various	Source of Aggregate: CPC Orange Grove Plant
Project No.: Various	Asphalt Source: Western Refining
Project Loc.: Various	Asphalt Grade: PG 70-10
	Type of Admix.: Type N Hydrated Lime (Wet Mixed)

Lab No.	Aggregate Name	Percentage	Adjusted %
D016-03A	Aggregate #1: M.A. Fines SE = 37	24.0	23.76
D016-03B	Aggregate #2: Washed M.A. Fines SE = 89	18.8	9.90
D016-03C	Aggregate #3: Bedding Sand SE = 86	10.0	9.90
D016-03D	Aggregate #4: Concrete Sand SE = 83	16.8	9.90
D016-03E	Aggregate #5: 3/8" M.A. (60/20) Computed	15.0	14.85
D016-03F	Aggregate #6: 5/8" M.A. (60/20) Theoretical = 37	31.8	30.49
Lime	Admix.: Type N Hydrated Lime	1.8	0.99
		<b>Total:</b>	<b>101.8</b>
Test Method: ADOT 201 & 813		Difference:	1.8
			0.99

D016-03A	D016-03B	D016-03C	D016-03D	D016-03E	D016-03F	Lime	Lab No.				
24.00	18.00	10.00	16.00	15.00	31.00	1.00	Percent				
Agg. #1	Agg. #2	Agg. #3	Agg. #4	Agg. #5	Agg. #6	Admix	Sieve (US/mm)	Composite w/o Admix	Composite w/ Admix	Control Points w/ Admix	
Percent Passing											
100.0	100.0	100.0	100.0	100.0	100.0	100.0	2" / 50	100	100		
100.0	100.0	100.0	100.0	100.0	100.0	100.0	1.25" / 31.5	100	100		
100.0	100.0	100.0	100.0	100.0	100.0	100.0	1" / 25	100	100		
100.0	100.0	100.0	100.0	100.0	100.0	100.0	3/4" / 19	100	100	100	
100.0	100.0	100.0	100.0	100.0	90.5	100.0	1/2" / 12.5	97	97	90-100	
100.0	100.0	100.0	100.0	100.0	48.7	100.0	3/8" / 9.5	84	84	70-85	
100.0	99.5	100.0	100.0	76.0	6.8	100.0	1/4" / 6.3	47	68		
99.3	97.9	99.6	99.3	36.4	4.4	100.0	#4 / 4.75	40	61	54-68	
78.2	77.4	78.6	86.9	8.0	3.3	100.0	#10 / 2.0	45	46	44-52	
72.1	70.0	71.6	82.9	8.3	3.1	100.0	#16 / 1.18	32	33		
58.4	49.4	81.2	63.8	7.7	2.8	100.0	#30 / .600	21	22		
39.8	29.8	78.8	40.8	6.8	2.5	100.0	#60 / .250	17	18	13-23	
33.8	22.9	20.3	28.4	6.4	2.4	100.0	#100 / .150	13	14		
29.1	18.4	13.9	17.8	6.8	2.3	100.0	#200 / .075	8	9		
21.9	5.7	5.7	5.5	4.9	2.4	100.0		8	9		
16.8	2.1	2.0	1.6	3.9	1.6	100.0		6.6	6.5	1-8	



Page 4

**Max Theor Gravity (Rice) Test & Aggregate Data**

Western Technologies Inc.

WT Job/Lab No.: 2143L016 / D016-03AA	Date: 05-06-10
Client: CalPortland	Mix Type: PAC No. 2 (Armed/Collector & Major Gravel)
Project Name: Various	Source of Aggregate: CPC Orange Grove Plant
Project No.: Various	Asphalt Source: Western Refining
Project Loc.: Various	Asphalt Grade: PG 70-10
	Type of Admix.: Type N Hydrated Lime (Wet Mixed)

Maximum Theoretical Gravity (Rice) Test			
Test Method: ARIZ 208			
Percent of Binder in Sample:		6.9	
Weight of Flask:	Flask 1	0.0	
	Flask 2	0.0	
	Flask 3	0.0	
Weight of Sample and Flask:	Flask 1	1063.4	
	Flask 2	1064.1	
	Flask 3	1065.9	
Wt. of Sample, Flask, Water, & Glass Plate:	Flask 1	4320.4	
	Flask 2	4322.9	
	Flask 3	4320.8	
Weight of Glass Plate:	Flask 1	27.2	
	Flask 2	27.2	
	Flask 3	27.2	
Weight of Sample in Air ("W <sub>air</sub> "):	Flask 1	1063.4	
	Flask 2	1064.1	
	Flask 3	1065.9	
Loss of Binder from mixing:		-2.4	
Wt. of Flask and Water (B):	Flask 1	3677.8	
	Flask 2	3679.2	
	Flask 3	3683.4	
Wt. of Sample, Flask, & Water (C):	Flask 1	4192.2	
	Flask 2	4195.7	
	Flask 3	4203.3	
Surface Dry Wt. SSD ("W <sub>sd</sub> "):	Flask 1	1065.2	
	Flask 2	1066.1	
	Flask 3	1067.8	
Volume of Voidless Mix ("V <sub>vm</sub> "):	Flask 1	449.8	
	Flask 2	449.6	
	Flask 3	449.6	
Maximum Sp. Gravity ("G <sub>mm</sub> "):	Flask 1	2.364	
	Flask 2	2.367	
	Flask 3	2.371	
Average Maximum Sp. Gravity ("G <sub>mm</sub> "):		2.367	
Average Maximum Density (PCF):		147.5	
"G <sub>mm</sub> " Range:		0.007	

All Weights in Grams. 0.0 = Not Weighed

Maximum Theoretical Gravity (Rice) Test Design Calculations	
Asphalt Specific Gravity @ 77°F (G <sub>as</sub> ):	1.0214
Effective Specific Gravity:	2.584
Asphalt Absorbed (%):	0.77

Coarse Specific Gravity	
Test Method: ARIZ 210	
Oven-Dry Weight (g):	3030.2
"SSD" Weight (g):	3999.0
Weight in Water (g):	2457.8
Bulk (Dry) Sp. Gravity:	2.550
"SSD" Sp. Gravity:	2.596
Apparent Sp. Gravity:	2.669
Water Absorption (%):	1.75

Fine Specific Gravity	
Test Method: ARIZ 211	
Oven-Dry Weight (g):	439.1
"SSD" Weight (g):	508.2
Weight of Flask & Water (g):	686.9
Weight of Flask, Water & Sample (g):	993.2
Bulk (Dry) Sp. Gravity:	2.525
"SSD" Sp. Gravity:	2.601
Apparent Sp. Gravity:	2.676
Water Absorption (%):	1.23

Combined Specific Gravity	
Admixure Sp. Gravity:	2.200
Combined Bulk (Dry) (W/O Admix):	2.635
Combined "SSD" (W/O Admix):	2.587
Combined Apparent (W/O Admix):	2.673
Combined Water Absorption (%):	2.04
Combined Bulk (Dry) (with Admix):	2.531
Combined "SSD" (with Admix):	2.602
Combined Apparent (with Admix):	2.648

Composite Mineral Aggregate Properties		
Property	Value	Spec
Sound Brn. (AASHTO T-106) (%)	87	50 Min
1 or More Fractures (ARIZ 212) (%)	100	50 Min
2 or More Fractures (ARIZ 212) (%)	88	—
Liquid Limit (AASHTO T99):	—	—
Plastic Limit (AASHTO T99):	—	—
L.A. Abrasion (AASHTO T96)		
L.A. Abrasion @ 180 Rev. (%)	*4	9 Max
L.A. Abrasion @ 300 Rev. (%)	*21	40 Max
Uncompacted Voids (ARIZ 247)		
Uncompacted Voids (%)	—	—

\* Historical



07 MONTHLY STATEMENT OF REVENUE

City of Portland  
Water Revenue Values  
Sewer Revenue Values

Revenue Values

Month	Water	Sewer	Other	Total	Water	Sewer	Other	Total	Water	Sewer	Other	Total
Jan	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Feb	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Mar	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Apr	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
May	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Jun	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Jul	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Aug	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Sep	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Oct	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Nov	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Dec	11700	11700	11700	35100	11700	11700	11700	35100	11700	11700	11700	35100
Total	140400	140400	140400	421200	140400	140400	140400	421200	140400	140400	140400	421200

**Volumetric Calculations**

Western Technologies Inc.

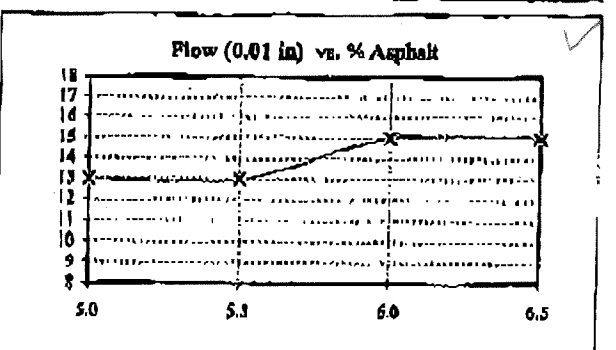
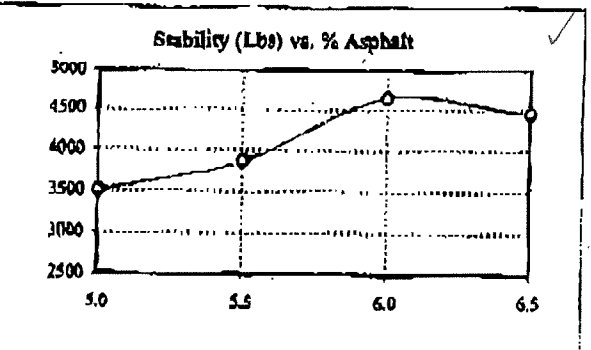
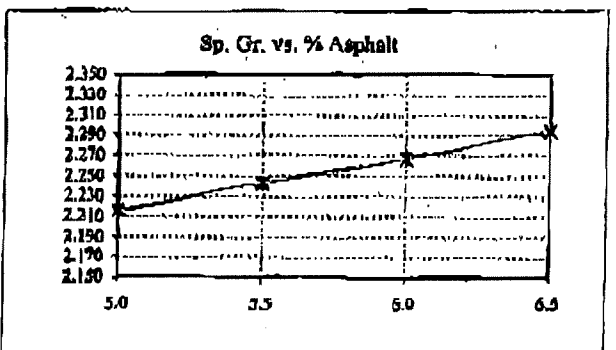
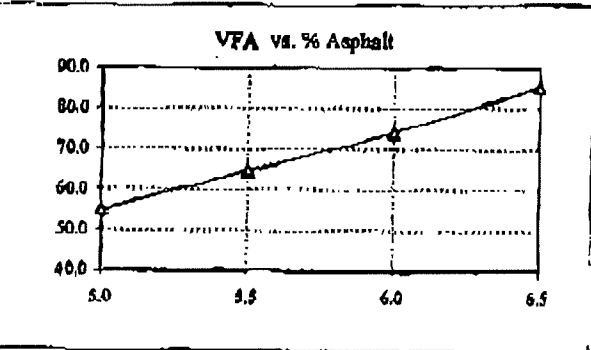
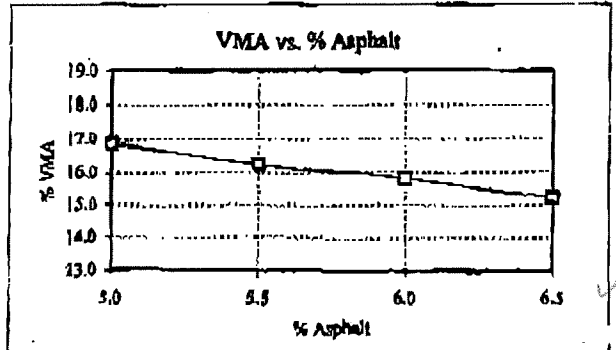
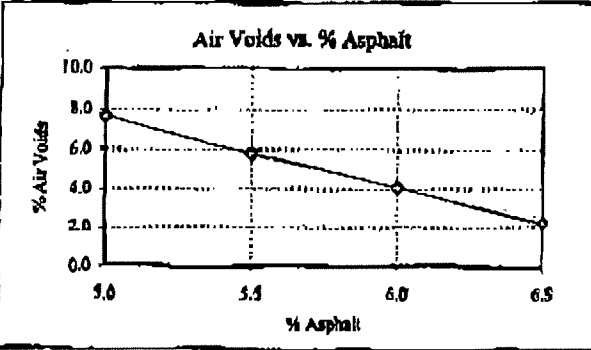
WT Job/Lab No.: 3140JL016 / D026-03AA	Date: 05-05-10
Client: CalPortland	Mix Type: PAG No. 2 (Arterial/Collector & Major Street)
Project Name: Various	Source of Aggregate: CPC Orange Grove Plant
Project No.: Various	Asphalt Source: Western Refining
	Asphalt Grade: PG 78-10
Project Loc.: Various	Type of Admix.: Type N Hydrated Linc (Wet Mixed)

**Volumetric Calculations**

Comparison Method: 75 Blow Marshall

Calculation Method: ARIZ 815

% Asp.	Sp. Gr.	% Aggr.	% Admix.	Total	Ass. Vol.	Admix Vol.	Eff. % Asp.	Dist. to	Eff. Asp.	Stability	Flow	VMA	VFA	EL Voids	Grav.
Tot. Wt.	Unit	Pct	(%)	% Admix	Vol. (%)	Vol. (%)	(Tot. Wt.)	Eff. Asp.	Vol. (%)	(lb)	(0.01 in)	(%)	(%)	(%)	
5.0	2.315	94.999	1.00	8.941	82.191	0.947	4.275	1.57	1241	3500	13	16.96	84.93	7.4	2.397
5.5	2.243	92.864	1.00	8.956	82.797	0.954	4.719	1.34	10,453	3840	13	16.29	84.81	5.9	2.369
6.0	2.177	92.069	1.00	8.921	83.235	0.959	5.233	1.23	11,714	4645	18	15.81	74.11	4.1	2.366
6.5	2.198	92.379	1.00	8.936	83.819	0.968	5.787	1.12	11,990	4483	15	15.92	85.35	3.3	2.347
6.5	2.248	93.445	1.00	8.938	83.589	0.953	4.829	1.33	10,730	4017	13	16.14	84.41	5.4	2.377
PAG 404 Specs											2000 Min	A-16	15.0 Min	53-57	



<b>Immersion Compression Test</b>		Western Technologies Inc.	
WT Job/Lab No.: 2140JL016 / D016-03AA		Date: 05-05-10	
Client: CalPortland		Mix Type: PAC No. 1 (Armed Collector & Major Streets)	
Project Name: Various		Source of Aggregate: CPC Orange Grove Plant	
Project No.: Various		Asphalt Source: Western Refining	
		Asphalt Grade: PG 70-10	
Project Loc.: Various		Type of Admix.: Type N Hydrated Lime (Wet Mixed)	

Resistance of Compacted Bituminous Mixtures to Moisture Damage						
Test Method: ARIZ #02						
Specimen Identification	1	5	6	2	3	4
Wet / Dry	Dry	Dry	Dry	Wet	Wet	Wet
Height (in.)	4.003	4.007	4.097	4.081	4.111	4.003
Dry Weight in Air (g)	1787.9	1782.4	1787.7	1784.9	1787.3	1784.2
S.S.D. Weight (g)	1790.7	1795.3	1801.0	1801.1	1802.9	1797.3
Weight in Water (g)	968.3	964.2	965.0	972.4	965.5	960.3
Bulk Specific Gravity	2.153	2.148	2.136	2.106	2.134	2.147
Bulk Density (PCF)	134.1	133.6	133.1	134.3	133.0	133.7
Average Sp. Gravity	2.145					
Average Density (PCF)	133.6					

Design Density of Stability Specimens (PCF):	140.1
Load applied to Immersion Specimens (PSI):	2700
Density Range of Specimens (PCF):	1.4
Percent of Stability Density = IMC Density / Stability Density * 100 (%):	95.43%

LOAD (lb.) (Before Conditioning)	6720	7350	7230
Dry Compressive STRENGTH (psi)	584.6	584.7	573.2
Average Dry Compressive Strength (psi)	584.8		

LOAD (lb.) (After Conditioning)	6120	4920	5270
WET Compressive STRENGTH (psi)	407.3	383.8	419.3
Average Wet Compressive Strength (psi)	403.3		

Index of Retained Strength (%)	71.4%
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**Immersion Compression Test**

Western Technologies Inc.

WT Job/Lab No.: 2149JL016 / D016-03AA	Date: 05-09-10
City: CalPortland	Mix Type: PAG No. 2 (Arterial/Collector & Major Streets)
Project Name: Various	Source of Aggregate: CPC Orange Grove Plant
Project No.: Various	Asphalt Source: Western Refining
	Asphalt Grade: PG 70-10
Project Loc.: Various	Type of Admix: Type N Hydrated Lime (Wet Mixed)

**Resistance of Compacted Bituminous Mixture to Moisture Damage**

Test Method: ARIZ #02

Specimen Identification	1	2	3	4	5	6
Wet / Dry	Dry	Dry	Dry	Wet	Wet	Wet
Height (in.)	4.083	4.087	4.097	4.081	4.111	4.083
Dry Weight in Air (g)	1787.9	1782.4	1787.7	1786.9	1787.5	1784.2
S.S.D. Weight (g)	1790.7	1795.3	1801.9	1801.1	1802.9	1797.9
Weight in Water (g)	968.3	964.2	965.0	972.4	965.5	968.3
Bulk Specific Gravity	2.153	2.148	2.136	2.186	2.134	2.147
Bulk Density (PCF)	134.1	133.6	133.1	134.3	133.0	133.7
Average Sp. Gravity	2.143					
Average Density (PCF)	133.6					

Design Density of Stability Specimens (PCF):	144.1
Load applied to Immersion Specimens (PSI):	2780
Density Range of Specimens (PCF):	1.4
Percent of Stability Density = [MC Density / Stability Density * 100 (%)	98.43%

LOAD (lb.) (Before Conditioning)	6720	7350	7236
Dry Compressive STRENGTH (psi)	534.6	584.7	575.2
Average Dry Compressive Strength (psi)	564.8		
LOAD (lb.) (After Conditioning)	5120	4820	5270
WET Compressive STRENGTH (psi)	407.3	383.6	419.3
Average Wet Compressive Strength (psi)	403.3		

Index of Retained Strength (%)	71.4%
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LIMS# 31149 (02-05-2010) Western Refining PG 70-10  
Temp (C) Viscosity (cp) Mixing Temperature Range, C = 162 - 168 \*P = 323 - 335  
135 563 Compaction Temperature Range, C = 149 - 154 \*F = 300 - 310  
175 121

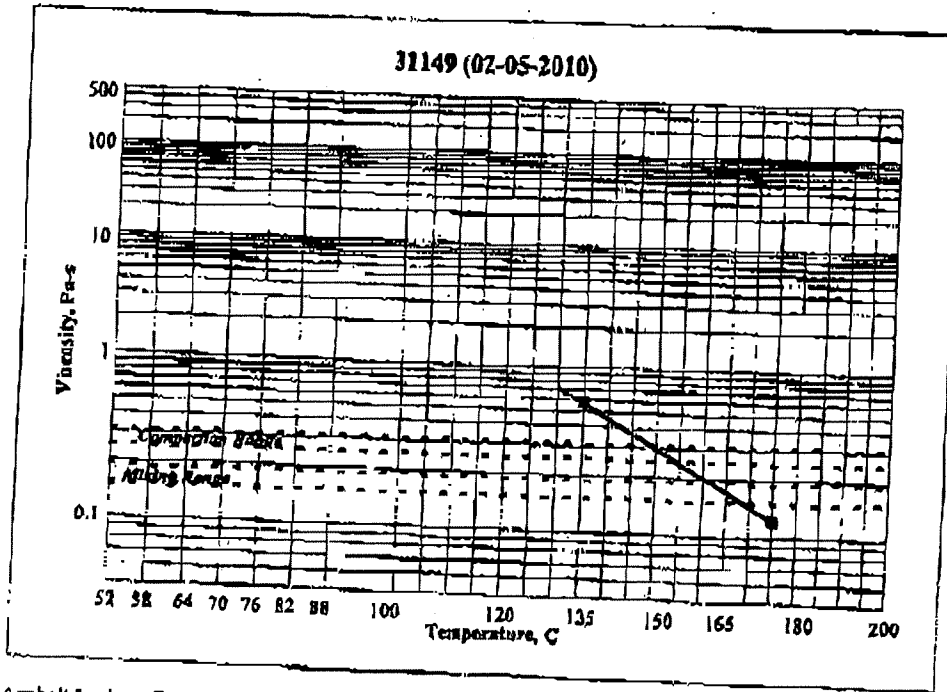
(Note: cp = Pa s \* 1000)

Specific Gravity 1.0264 @ 60F 8.587 lbs/gal @ 60F Open to Traffic: 172 P  
1.0224 @ 77F 6.36 API AZ (20 Pa-s) 78 C

DSR (Do not enter if using two RV measurements)  
Temperature, C  
G°/sin δ (kPa)

Enter either: 2 viscosities (cp = Pa s \* 1000)  
or: one viscosity & one DSR

Note: This data is for informational purposes. Actual mixing and compaction temperatures may require adjustments to meet field conditions. A compaction test strip is recommended.  
File obtained from the Asphalt Institute web site  
[www.asphaltinstitute.org](http://www.asphaltinstitute.org)



Asphalt Institute Temperature / Viscosity Excel Program

