HMA Local Agency Division 5 Specification

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Director Highways &
Local Programs



Aggregate and PG Binder alone will not improve bad roads.

The APWA Division 5 SC Goal is

- To develop specifications appropriate to the needs of the projects.
- WSDOT Specifications work very well for
 - High speed,
 - High volume,
 - High quantity (over 4500 Tons) paving projects.
- Local Agencies rarely build freeways

The Bigger Goal

Is to provide local agencies an economical process of HMA acceptance with minimal risk and maximum benefit.

The Mission

Of the APWA Division 5 committee is

. . .

- Clear Guidelines
- Testing and acceptance clarification

To do that the committee has determined that we must do 3 things

#1

Streamline the Mix Design verification process to save time and money

In the APWA revision mix

verification may be

performed on production

mix.

#2

Address Anti-Strip

Evaluation Needs and

Requirements

In the APWA Division 5 Revision Anti Strip Evaluation can be done using historic data or by testing

#3

Clarify the Testing needs and requirements

NHS - HMA Requirements

23 CFR requires testing be performed on FHWA funded projects on the NHS.

Another requirement is that testing be performed by qualified testers.

THE MIX DESIGN

The information needed to design an HMA Mix is:

- Number of ESALS,
- Number of Gyrations,
- Binder Grade location,
 location, location . . .
- Aggregate Class

Design the correct pavement section for the roadway needs
 Pavement Management Tools

http://www.wsdot.wa.gov/
Business/MaterialsLab/
Pavements/Default.htm

Calculate ESALs (Excel Spread Sheet 23 kb)

http://www.wsdot.wa.gov/ Business/MaterialsLab/ Pavements/Default.htm

Designing HMA Mixes - ESALs

Sample Interactive Worksheet

ESAL CALCULATION

This on-line spreadsheet should only be used if you do not have access to the MNESALS electronic spreadsheet. To use, please fill in the required information in the DARK GREY boxes.

ADL = Average Daily Load
Design Period (in years):

Growth Factor (as decimal):

0.1

Vehicle Classification	Base Year AADT (2-way)	Flexible ESAL Factors	Base Year ADL	Growth Factor	Design Year AADT (2 way)	Design ADL
Cars and pickups	3000	0.0007	2.1	1.1	20182	14
2 axle, 6 tire SU		0.25	0	1.1	0	0
3+ axle SU		0.58	0	1.1	0	0
3 axle TST		0.39	0	1.1	0	0
4 axle TST		0.51	0	1.1	0	0
5+ axle TST		1.13	0	1.1	0	0
Buses, trucks w/trailers	100	0.57	57	1.1	673	383
Twin trailers		2.4	0	1.1	0	0
Total			59.1		20855	398

Average ADL 228.3476235
No. of days in design period 7300
Design lane factor 750121.9432
Cumulative design lane flexible ESAL 840136.5764

Select the correct gyration level mix during pavement design

Determine Gyration level based on ESALs for your project

Design ESALs* (million) < 0.3	Compaction Parameters			Typical Roadway Application
	Nicital	N _{design}	N _{max}	
	6	50	75	Applications include roadways with very light traffic volumes such as local roads, county roads, and city streets where truck traffic is prohibited or at a very minimal level. Traffic on these roadways would be considered local in nature, not regional, intrastate, or interstate. Special purpose roadways serving recreational sites or areas may also be applicable to this level.
0.3 to < 3	7	75	115	Applications include many collector roads or access streets. Medium-trafficked city streets and the majority of county roadways may be applicable to this level.
3 to < 30	8	100	160	Applications include many two-lane, multilane, divided, and partially or completely controlled access roadways. Among these are medium to highly trafficked city streets, many state routes, U.S. highways, and some rural Interstates.
≥ 30	9	125	205	Applications include the vast majority of the U.S. Interstate system, both rural and urban in nature. Special applications such as truck-weighing stations or truck-climbing lanes on two-lane roadways may also be applicable to this level.

The anticipated project traffic level expected on the design lane over a 20-year period. Regardless of the actual design life of the roadway, determine the design ESALs for 20 years.

As defined by A Policy on Geometric Design of Highways and Streets, 2001, AASHTO.

Select binder grade (pdf document 43 kb)

Binder Grades

- The base grade for oil in Western Washington is 58-22, in Eastern Washington it is 64-28. Bumping, or going up in grade, should always start with the grade specific to the geographic area you are working. For more information, see section 5-04.2 of the Standard Specifications.
- We rarely specify −34 Binders in Washington. Production for HMA with −34 binders has proved problematic the lab recommends not using them at this time. We restrict their use to the mountain pass highways.

Ask for the correct mix in the contract documents

Sample Proposal

Bid Item	Approximate Quantity	Items with Unit Price Bid	Unit Price Dollars Cents	Amount Dollars Cents		
35	2490 Tons	HMA CI ½ inch PG 64-22 Per Ton				

Specifications for HMA

WSDOT Standard

- Requires Verified MixDesign
- Statistical acceptance for over 4000 tons –
- Requires CPF for out of specification material

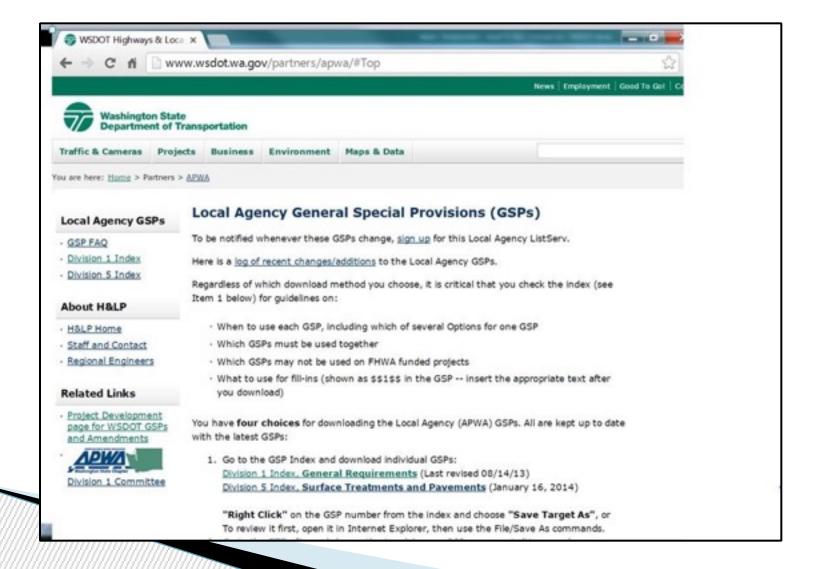
APWA GSP

- Allows either verified or non verified mix
- Allows non-statistical acceptance for any quantity
- Requires CPF for out of specification material

Incorporate appropriate specification changes to implement the process you want during construction

http://www.wsdot.wa.gov/partners/apwa/

Page looks like



CPFs You only need to do this when:

- You are using Non-statistical acceptance and have out of specification material or
- 2. You are under Statistical Acceptance

Statistical Analysis of Materials

- The SAM program is a web based computer program that is set up to calculate the Composite Pay Factor (CPF) for out of specification material and Statistically Accepted material.
- If you need a CPF contact your local programs office for assistance.

Module 3

HMA Approval and Acceptance Process

Record Of Materials (ROM)

This could actually be the subject of another class but these are the parts you really need to know.

- A ROM can be used to track and record materials and documents as they occur throughout a project.
- The ROM lists each bid item and the individual component materials that are used for it.
- The ROM provides information to help you review and approve or reject material submittals
- A ROM lists Standard Specification and Construction Manual references that apply to each material component and any Special Provisions or Plan Sheets that provide information on the item.

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		WSDOT -	Materials L	aboratory	Record of Ma		-				
			-		-	-					
							8				
PSE_nbr	Contract_	B.I.	QTY	UOM	Bid_Item_	spec_sour	Doc_Requ	QPL	Std_Spec_	Minor	
SB0502	TA1862	100.01			BASE BID	2					
SB0502	TA1862	112.01	1920	C.Y.	EMBANK		See Cons		2-03.3(14)	S -	
SB0502	TA1862	113.01	6	EACH	CATCH B		WSDOT		7-05		
SB0502	TA1862	113.02	6	EACH	FRAME &	-	'APPROV		7-05		
SB0502	TA1862	114.01	6	EACH	CATCH B	4	WSDOT		7-05	0.00	
SB0502	TA1862	114.02	6	EACH	FRAME &		'APPROV		7-05		
SB0502	TA1862	115.01	3	EACH	STORM D	1	WSDOTI		9-12.4		
SB0502	TA1862	115.02	3		RING & C		'APPROV	7	9-05.15(1)		
SB0502	TA1862	116.01	3	EACH	DEBRIS C		WSDOT		PS G7		
SB0502	TA1862	117.01	1338	L.F.	STORMS		Mfr. Cert.	Υ	SP 29		
SB0502	TA1862	118.01	750		STORM S		Mfr. Cert.	Υ	SP 29		
SB0502	TA1862	119.01			PERCOLA				SP 29		
SB0502	TA1862	119.02			DRAIN PI		Mfr. Cert.	Υ	SP 30		
SB0502	TA1862	119.03			GRAVEL		1 Accepta		9-03.12(4)		
SB0502	TA1862	119.04			CONSTRU		1 Sample	Υ	9-33		
SB0502	TA1862	121.01	11850	L.F.	PAVEMEN				SP 27		
SB0502	TA1862	121.02			HMA FOR		Sample pe		5-04		
SB0502	TA1862	121.03			PAVING A		Acceptano		9-02.1(4)		
SB0502	TA1862	121.04			MIN. AGG		1 Accepta		9-03.8		
SB0502	TA1862	121.05			ASPHALT		Supplier's		5-04.3(5)A	& 9-02.1(6)	
SB0502	TA1862	122.01		TON	HMA CL.		Sample pe		5-04		
SB0502	TA1862	122.02	433.5	TON	PAVING A		Acceptano		9-02.1(4)		
SB0502	TA1862	122.03			CL. 1/2 IN		5 Accepta		9-03.8		
SB0502	TA1862	122.04			ASPHALT		Supplier's		5-04.3(5)A	& 9-02.1(6)	
SB0502	TA1862	123.01		TON	HMA CL.		Sample pe		5-04		
SB0502	TA1862	123.02		TON	PAVING A		Acceptano		9-02.1(4)		
SB0502	TA1862	123.03			CL. 1/2 IN		1 Accepta		9-03.8		
SB0502	TA1862	123.04			ASPHALT		Supplier's		5-04.3(5)A	& 9-02.1(6)	
SB0502	TA1862	124.01		TON	CRUSHED		3 Accepta		9-03.9(3)		
SB0502	TA1862	125.01		TON	CRUSHED		2 Accepta		9-03.9(3)		

ROM From WSDOT After Reformatting

	Fossc Prepa	red RON	1			
T - Materials Labora Bid_Item_nbr	Item_Oty		Bid_Item_desc	Doc_Requirement	QPL	Std_Spec_Minor
20.01	290	TON	HMA CL. A IN. PG 64-28	Sample per 9-4.7 of Const. Man.		5-04
					=	
20.02	17.4	TON	PAVING ASPHALT	Acceptance per 9-4.2 & 9-5.7 of Const. Manual or See Current QPL	Y	9-02.1(4)
20.03	272.6	TON	CL. 1 IN. MIN. AGG.	1 Acceptance Sample(s) Required		9-03.8
20.04			ASPHALT FOR TACK O	Supplier's Cert of Compliance or See Current QPL	Y	5-04.3(5)A & 9-02.1(6)
20.05			Anti Strip Additive	Verify product added to PG Binder at refinery or at the Asphalt Plant	Y	9-02.4

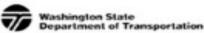
A good Documentation Package

Includes a document that tracks what was used for each item of work where in the file system to find the documentation.

At WSDOT it is referred to as a "Maintained ROM"

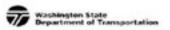
Request For Approval of Material (RAM) One variation of an Approval

document



Contract Your Co	ntract Number	FA Number Federal Air	1 Number	SR		Date 8/10/200	6
Section				Count			
Here to	*****				County		
Contract Really C	or licent Guys Who Build Roads		Subcontractor				
seemi c	aca Oeys Hao beau roads				_		
For ass	istance in completing, see ins	eructions and Ex	ample		For \	WSDOT	Jee Only 101
Bid Item No.	Material or Manufacturer's Product Type		tion of Fabricator. or Pit Humber	Specification Reference	PE Appr1 Code	Mdgtr. Appril Code	File No.
20.01	HMA Class 1/2" PG 64-28	Lakeside Industri	es Inc.	5-04	1		
20.02	PG 64-28 Binder	Chevron - Richm	ond Beach	9-02.1(4)	1,2		
20.03	Class 1/2" Min Agg	Proctor Creek D-	316	9-03.8	1		
20.04	Tack Cost	Paramount Petroi	oum, Seattle, WA	5-04.3(5)A & 9-02.1(6)	QPL 2148		
20.05	Anti Strip	Ultracote UP-500	9-02.4	**			
		1.					
Project E	ngineer	Date	State Materials	Engineer		Det	le .
2. Con: 9. Con: 6. Con: 6. Con: 7. App: 8. Sour 9. App:	ne Approved: roval Withheld: Submit samples for roval Withheld:	upon Satisfactory Te of Compliance for App as for Approval priors ings for Approval pols Shipment or W.SDOI entiticate of Origin to F edits State Materials L prefirminary evaluation	at Prepart for samples roval prior to-use of a suse of material respected material hispect Engineer, aboratory for Approve	of materials to be naterial. terial. shalf be used.			•

Project Engineer Distribution	Land to the street of the street	State Materials Engineer	Distribution	
☐ Contractor ☐ Region Operations Engineer	☐ Region Materials ☐ State Materials Lab	General File Fabrication Inspection	Signing Inspection	



WSDOT MATERIALS LAB

07/19/2006

Aggregate Source Approval Report

Aggregate Source: PS-D-Owner: Leasee: Known as: Located In: NW1/4NW1/4 Sec 35,NE1/4NE1/4 Sec 34 Section 34,35, T28N County: Snohomish Remarks: Pit Run Materials: Prior to incorporating any of the following into a job, Gradation and Sand Equivalent tests shall be performed to determine if the material does in fact meet specification for the intended use: **Backfill for Sand Drains Bedding Mararial for Rigid Fine** Backfill for Rock Wall Buckling Material for Thermoplastic Pipe Blending Sand Foundation Material for Classes A, B or C Gravel Backfill for Drains and Crywells Grav el Backfill for Foundation Class B Gravel Backfill for Pipe Zone Bedding Gravel Backfill for Walls Grav el Borrow Sand Drainage Black et Salect or Common Borrow No Preliminary Tests are required to be performed by the State Materials Lab Gravel Base: Test Date: Expiration Date: Drainage: R Value: Swell Presoure: Contact the Regional Materials Office to request PRELIMINARY SAMPLES be acquired. Evaluation and approval of this site as a source of GRAVEL BASE is required prior to use. **Hineral Agg. and Surfacing:** Test Date: Expiration Date: Appenent Sp. G.: Absorption: Bulk Sp. G. (SSD): Bulk Sp. G.: Dego LA Contact the Regional Materials Office to request PRELIMINARY SAMPLES be acquired. Evaluation and approval of this site as a source of MINERAL AGGREGATES AND SURFACING is required prior to use. Expiration Date: Portland Cement Concrete Aggregates: Test Date: ASR - 14 Day : ASR - One Year: CCA Absorption: CCA Sp.G: FCA Absorption: FCA Organics: FCA Sp. G: LA: Petrographic Analysis: Moster Strength: Contact the Regional Materials Office to request PRELIMINARY SAMPLES be acquired. Evaluation and approval of this site as a source of AGGREGATES for PCC is required prior to use. Expiration Date: Riprap and Quarry Spalls: Test Date: 07/19/2006 Absorption: Duk Sp. G.: Apparent Sp. G.: Buk Sp. G. (SSD): Deg: LA:

Contact the Regional Materials Office to request PRELIMINARY SAMPLES be acquired. Evaluation and approval of this site as a

Region Operations_

Project Engineer___

source of R3P RAP AND QUARRY SPALLS is required prior to use.

Distribution: Physical Testing.....

Pit Approval Report

Approval Tool

PG Binder

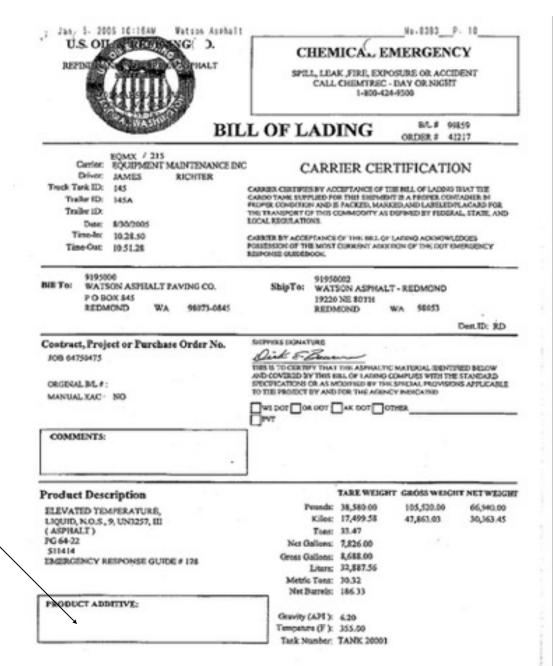
Bill of Lading

Considered a

Certificate of

Compliance

Anti Strip Information will be here



Sample Test Report

One of many types of Acceptance documents

6/28/2006 Northwest			4,75	Project Engin	SR Number N/	A :	ector North of H				IA3399				
E	å Bå	F S Other	1/2" HMA	_ [Wearing Base Lensing		Or Temperatures Start 290 End 288		tal Number 1654	Rice Des			0035	3"	
135	the second second second	138+12	Ahmad on Sta.	Lati	312 Sublot Let		14	Lase Dir.	EB WE	NB. D	Other	Late:	400 AG	P Test Term 185	
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1		0	Zero	0	13500		0.0			146.5	14	5.45	145,959	93.7%	
2		0	(L)	62.4	13562.4		0.0			144.5	14	5,55	146.059	93.7%	
3		0	(L) x 2	124.8	13624,8		0.0			143.5	1.	43.8	144,303	92.6%	
4		0	(L) x 3	187.2	13687.2		0.0			144.2	14	3.95	144.454	92.7%	
5		0	(L) x 4	249.6	13749.6		0.0			143.5	14	3.55	144.052	92.5%	
legitri n	Station E	nding Station	Ahead on Sta.	Lati	ength (A) Satist Len [A] × 0.2]		Wish (W)	Lase Bit	EB WB	NB D	Sher	Let#	Quantity AC 400	P Test Term	
Test (umber	(N) Visitue Table (716)	Randont Li (X) x (L			e'- Sieg. Ste. - Test Ste.	(Y) Value Table (716)	Other (Y) × (W)	Measured Depth	Core	Gauge		etige	Corrected Geogr	Percent of Rice	
1			Zeto				B.W.C.T.			143.5	1.	43.8	144,303	92.6%	
2			IL)						- HOW-	1423	14	2.75	143.25	91.9%	
3			(L) x 2						- HOW-	144.1	14	2.75	143.25	91.9%	
4			(L) x 3							140.9	14	41.5	141,995	91.1%	
5			(L) x 4						- HOVE N	144.1	14	44.1	144.604	92.8%	
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progra		init the im	anianon conti	mea in	this worksheet is	umae ab to u	ase the nun	ners work i	ii ulie s.A.)	M P	2501	DOV P - P	Codes - Single Drum - Double Drum reumatic Tandem Steel	n Vibeator	
	perator.		Date		Steel hapedor			4-	Cortsec				Date		

Maintained ROM

		Fossc Prepared ROM	1 3				
		(C-1879-1979)		,			
		Established Committee Comm		Widelines (million final)			
QTY	UOM		Apvl. Code		QPL	Std_Spec_Minor	_
290	TON	HMA CL. A IN. PG 64-28		Sample per 9-4.7 of Const. Man.		5-04	_
		Lakeside Ind. Issaquah	1**	"This material will be accepted by Manufacturer			_
				Certificate of Compliance due to small quantity.			_
17.4	TON	PAVING ASPHALT - PG 64-28		Acceptance per 9-4.2 & 9-5.7 of Const. Manual or 8	Y	9-02.1(4)	_
		Chevron Richmond Beach	1, 2				
				Request for Bill of Lading made 10/15/2006			
070.0	TON			Sanda Barria		0.00.0	
2/2.6	ION	CL. 1 IN, MIN. AGG.	1	1 Acceptance Sample(s) Required		9-03.8	_
		Proctor Creek D 316	1*	'Accepted by Visual Inspection			
		Have Pit Approval Report for D-316					_
		9					_
		ASPHALT FOR TACK COAT		Supplier's Cert of Compliance or See Current QPL	Υ	5-04.3(5)A & 9-02.1(6)	
		Paramount Petroleum, Seattle	2148	Bill of Lading on file for this product.			
							_
		And Chin Addition		Verificant destruction in DC Disease at a first	V	0.004	
		Ans outp addieve			Y	9-02.4	
		Ultracole UP-5000	2118				
				and strip show on the or Louisy on the.			
		2		1			
	290 17.4	290 TON	Ord Of Materials OTY UOM Bid_Item_desc 290 TON HMA CL. A IN. PG 64-28 Lakeside Ind. Issaquah 17.4 TON PAVING ASPHALT - PG 64-28 Chevron Richmond Beach 272.6 TON CL. 1 IN. MIN. AGG. Proctor Creek D 316 Have Pit Approval Report for D-316 ASPHALT FOR TACK COAT Paramount Petroleum, Seattle Anti Strip Additive	ord Of Materials OTY UOM Bid_Item_desc Apvl. Code 290 TON HMA CL A IN. PG 64-28 Lakeside Ind. Issaquah 1"" 17.4 TON PAVING ASPHALT - PG 64-28 Chevron Richmond Beach 1, 2 272.6 TON CL 1 IN. MIN. AGG. Proctor Creek D 316 Have Pit Approval Report for D-316 ASPHALT FOR TACK COAT Paramount Petroleum, Seattle 2148 Anti Strip Additive	OTY UOM Bid Item desc Apvl. Code Doc Requirement 290 TON HMA CL A IN. PG 64-28 Sample per 9-4.7 of Const. Man. Lakeside Ind. Issaquah 1" "This material will be accepted by Manufacturer Certificate of Compliance due to small quantity. 17.4 TON PAVING ASPHALT - PG 64-28 Acceptance per 9-4.2 & 9-5.7 of Const. Manual or 3 Chevron Richmond Beach 1, 2 Request for Bill of Lading made 10/15/2006 272.6 TON CL 1 IN. MIN. AGG. 1 Acceptance Sample(a) Required Proctor Creek D 316 1" "Acceptance Sample(a) Required ASPHALT FOR TACK COAT Supplier's Cert of Compliance or See Current CPL Paramount Petroleum, Seattle 2148 Bill of Lading on file for this product. Anti Strip Additive Verify product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the control of the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery or at the product added to PG Binder at refinery at the product added to PG Binder at refinery at the product added to PG Binder at refinery at the product adde	Apvl. Code Apvl. Code Doc Requirement OPL 290 TON HMA CL. A IN. PG 64-28 Lakeside Ind. Issaquah 11" "This material will be accepted by Manufacturer Certificate of Compliance due to small quantity. 17.4 TON PAVING ASPHALT - PG 64-28 Chevron Richmond Beach 1, 2 Request for Bill of Lading made 10/15/2006 272.6 TON CL. 1 IN. MIN. AGG. 1 Acceptance Sample(a) Required Proctor Creek D 316 Have Pit Approval Report for D-316 ASPHALT FOR TACK COAT Supplier's Cert of Compliance or See Current OPL Y Paramount Petroleum, Seattle 2148 Bill of Lading on file for this product. Verify product added to PG Binder at refinery or at the Y Ultracote UP-5000 2118 Anti-Strip requirement has been walved by the city	ord Of Matrials OTY UOM Bid Item_desc

Documentation Items

- Approval Documents RAM, QPL, (or like)
 - Should include every component of the finished product, PG Binder, Aggregates, Blending Sand, Anti-Strip (when used), Pit Approval Reports
- Acceptance Documents
 - Test Reports, Certification (when required or allowed), Truck Tickets, Inspector Daily Reports.
- Mix Design
 - See Section 5-04.3, Standard Specifications or

What is a good Documentation Package?

The documentation should clearly show

the material used, the manufacturer, the quantity placed, the quality of the product.

A good Documentation Package

Must be organized.



Acceptance Exceptions

- Appendix 52.108 of the Local Agency Guidelines (LAG Manual) lists exceptions to acceptance criteria that local agencies can use. Be sure to record any exceptions your agency intends to use and modify the Maintained ROM document. Remember to cite the appendix as a reference in the Specification column.
- The ROM is a record of the agency's material acceptance process and a map to the contents of the files.
- During a Project Management Review (PMR) we will look for a maintained ROM. We will use it to locate information in your files.