Pacific Coast Division

SAN FRANCISCO · LOS ANGELES · SACRAMENTO · SEATTLE

THE ASPHALT INSTITUTE

Executive Offices and Laboratories • University of Maryland • College Park, Maryland

B. A. VALLERGA
MANAGING ENGINEER

RUSS BUILDING
SAN FRANCISCO 4

September 21, 1956

Professor Carl L. Monismith
University of California
Building T-11 Room 124
Berkeley 4, California

Dear Carl:

I am enclosing for your information a copy of the minutes of the First Pacific Coast Conference on Asphalt Specifications held in San Francisco last June. I am sure you are interested in keeping up to date with the joint efforts of industry and user to promote quality and foster standardization in asphalt specifications.

Very truly yours,

B. A. Vallerga

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MINUTES OF THE
FIRST PACIFIC COAST CONFERENCE ON ASPHALT SPECIFICATIONS
JUNE 25-26, 1956

1. Call to the Conference

Pursuant to call the First Pacific Coast Conference on Asphalt Specifications was held in the Empire Room of the Sir Francis Drake Hotel in San Francisco on Monday and Tuesday, June 25 and 26, 1956. Notice of meeting with invitation to participate was issued per letter dated June 7, 1956 from ten (10) Pacific Coast asphalt producers to the following ten leading Pacific Coast asphalt consumer agencies:

State

1. Arizona Highway Department - W. E. Willey
2. California Division of Highways - G. T. McCoy
3. Idaho Department of Highways - E. V. Miller
4. Nevada Department of Highways - H. D. Mills
5. Oregon State Highway Department - R. H. Baldock
6. Washington Department of Highways - W. A. Bugge

Federal

7. Bureau of Public Roads, Division 7 - R. Archibald
8. Bureau of Public Roads, Division 8 - F. E. Andrews

Military

9. Corps of Engineers, South Pacific Division - Brig.General W.F. Cassidy
10. Corps of Engineers, North Pacific Division - Brig.General L.H. Foote

The meeting was called to order at 1:30 P.M. on Monday, June 25, 1956 by B. A. Vallerga, Managing Engineer, Pacific Coast Division, The Asphalt Institute, who acted as Chairman and Moderator for the discussions at the request of the conference participants.

2. Attendance

The following delegates were in attendance:

Consumer Agencies

1.	Arizona Highway Department.	W. G. O'Harra
2.	California Department of Highways	F. N. Hveem
		E. Zube
		J. Skog
3.	Idaho Department of Highways.	G. B. Bennett
4.	Nevada Department of Highways	L. W. Little
		M. E. Lamb

5.	Oregon Department of Highways.	F. N. Hveem (by letter of proxy)
6.	Washington Department of Highways.	C. E. Minor
7.	Bureau of Public Roads (Division 7).	D. J. Steele
8.	Bureau of Public Roads (Division 8).	R. M. Schwegler
9.	Corps of Engineers, South Pacific Division .	R. A. Chisholm A. A. Schultz J. E. Ott D. Fenton
10.	Corps of Engineers, North Pacific Division .	South Pacific Division Delegation (by letter of proxy)

Producers

1.	American Bitumuls and Asphalt Company. . . .	N. H. Angell W. J. Kari J. D. Giannotti
2.	Douglas Oil Company of California.	W. F. Lyte J. J. Stanko
3.	Envoy Petroleum Company.	H. D. Webb
4.	Macmillan Petroleum Company.	E. J. Barnes P. McHenry
5.	Richfield Oil Corporation.	F. L. Dunlap E. C. Weber
6.	Seaside Oil Company.	W. F. Rhodehamel
7.	Shell Oil Company.	J. C. Dalton J. A. Lettier R. L. Woodruff
8.	Union Oil Company of California.	D. L. Nielsen F. S. Scott

Observers (non-voting)

1.	California Research Corporation.	R. J. Schmidt R. S. Winniford
2.	The Asphalt Institute.	B. A. Vallerga (Moderator) Vaughn Marker

3. Purpose of Conference

The purpose of the conference was to discuss thoroughly and take whatever action considered appropriate in connection with the following subjects:

a. Reduction in grades of asphalt.
b. Uniformity in asphalt specifications on the Pacific Coast
c. Any other subject of mutual interest to the consumer-industry group.

It was agreed that the discussions would be held in the general order as outlined above.

4. Reduction in Grades of Paving Asphalt

Industry representatives proposed a reduction in number of grades of paving asphalt by user agencies to conform to those recommended by the Pacific Coast Division of the Asphalt Institute, namely the 40-50, 60-70, 85-100, 120-150 and 200-300 penetration grades. (Reference Pg. 10, May 1956 edition, "Asphalts, Paving and Liquid" published by The Asphalt Institute, Pacific Coast Division, distributed to all agencies by mail prior to meeting.)

After considerable discussion of the various effects of asphalt consistency on the design and construction of asphaltic pavements and their significance, it was generally agreed that the above cited grades would provide adequate coverage of the ranges of consistency normally required. Some reservations were expressed, however, by Division 8 of the Bureau of Public Roads regarding the elimination of grade 150-200, and the North Pacific Division of the Corps of Engineers regarding the elimination of grade 100-120, which are used in some quantity in the Pacific Northwest. Additional time was requested by these two agencies to review their situations.

It was also noted that experience has indicated that asphalts being manufactured to meet the new California asphalt specifications behave somewhat differently than those previously supplied. (Reference "Memorandum on Background and Performance Characteristics of Asphalts Meeting New California Specifications" prepared by B. A. Vallerga and distributed to all agencies by mail prior to the meeting.) Because of this change in behavior of asphalt corresponding to a change in specifications, it was considered a possibility that the dictates of a given geographical area may be nullified. In view of the fact that the meeting would later consider possible change in specifications, this point was considered of utmost importance and significance.

5. Reduction in Grades of Liquid Asphalts

Consideration was given to the possibility of reducing the number of grades of liquid asphalt. The following tabulation indicating grades currently in common usage was compiled at the meeting from information supplied by user representatives:

	GRADES																	
	SC						MC						RC					
	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
USERS																		
1. California	-	-	X	X	X	X	-	-	X	X	-	-	-	-	-	X	-	X
2. Arizona	-	-	X	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-
3. Nevada	-	-	X	X	X	X	-	X	X	X	-	-	-	-	-	-	-	-
4. Oregon BPR	-	-	-	-	-	-	-	-	X	X	-	-	-	-	X	X	-	-
5. Washington	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	X	X
6. BPR																		
Division 7	-	-	X	X	X	-	-	-	X	X	X	X	-	-	X	X	X	-
Division 8	-	-	-	-	-	-	-	-	X	X	X	X	-	-	X	-	X	X
7. Corps of Engr.																		
So. Pac. Div.	-	-	X	X	-	-	-	X	-	X	-	-	-	-	-	X	-	-
8. Idaho	-	-	X	-	X	-	-	X	X	X	X	X	-	X	X	-	X	X

After a thorough review and discussion of the tabulation by the group, it was moved by Mr. O'Harra, as follows:

> MOVED, that all "0" and "1" grades of liquid asphalts be eliminated with the exception of grade MC-1, and that grades "2" and "3" be definitely retained.

Motion seconded by Mr. Hveem and passed. (The Corps of Engineers and Bureau of Public Roads went on record as "not voting".)

Further review of the above tabulation revealed the possibility of combining liquid grades 4 and 5 into a single grade of intermediate viscosity. Further investigation of the feasibility of this action by all concerned was considered to be desirable.

It was the opinion of several user agencies that present specifications for liquid asphalts do not insure products from different producers which will behave in a similar manner in the field. For example, one producer's MC may act like another producer's RC. Possible causes for this phenomena were discussed.

No further action were taken on liquid asphalts, except to suggest and recommend that each participating agency investigate further the possibility of reducing the number of liquid grades and developing test methods and/or specifications which would guarantee better and more uniform products.

6. Uniformity in Asphalt Specifications on the Pacific Coast

Industry representatives emphasized the urgent need for uniformity in asphalt specifications among user agencies on the Pacific Coast. Various specifications for asphalts are presently being used and/or proposed for use on the Pacific Coast by different specification-writing agencies. These specifications differ quite widely in many respects and impose a definite hardship on the producer who faces the task of supplying asphalts to meet these specifications from limited tankage at any one refinery. The consumer's interest in uniformity is just as intense, for uniformity fosters the dependability of the product and lowers its cost.

Most of the changes are being made or proposed with the sincere desire of specifying better and more durable asphalts. This trend is viewed with favor by the asphalt industry on the Pacific Coast, but uncoordinated actions by user agencies generally result in confusion, disorder and higher production costs at the refineries. It was proposed by industry representatives, therefore, that the conference review the entire matter of asphalt specifications by considering all and any proposals regarding possible changes in test methods, procedures or limits with a view toward development and adoption of a realistic set of asphalt specifications which would provide asphalts having the essential characteristics desired and which would be acceptable to all user agencies on the Pacific Coast. Asphalt industry representatives believed this procedure to be feasible if carried out simultaneously in the area covered by the five Far West states and possibly including Idaho. Agreement on a suitable set of asphalt specifications should be made at the earliest practicable date with provision for periodic review in future years as the technology of asphalt advances.

In proposing the development and adoption of a new, realistic asphalt specification which would be made uniform on the Pacific Coast, the asphalt industry has several objectives in mind which it feels would be of benefit to both the consumers and the producers, as follows:

1. All areas on the Pacific Coast would be assured of receiving an asphalt of maximum quality and uniformity from available crudes at maximum economy.

2. Based on current knowledge and experience a set of asphalt specifications can be drafted which is both realistic and definitive of better and more durable asphalt. Such specifications would eliminate excessively cracked or inferior asphalts which have high volatility and poor oxidation resistance. Asphalts passing these specifications would have properties known to be desirable and beneficial in asphalt paving work. Use of select crude sources and good refining techniques would be insured.

3. Tests which have outlived their usefulness or which measure properties already defined by other specification tests or which have no true significance would be eliminated. This would save considerable laboratory time for both the producer and the consumer without sacrifice of quality control.

4. Uniformity of asphalt supply would be improved considerably. The refinery would operate on one stock under closely controlled conditions. To the user this means that asphalts from different sources would behave more like one another, and construction methods would be least affected.

5. Production, testing, storage and delivery of asphalts would be simplified for all concerned."

The representatives of asphalt producers in attendance recommended the following proposed asphalt specification which had been distributed with the call to the meeting. It was stated that this specification is considered by industry to fully describe a quality asphalt product.

	Grade of Asphalt				
	40-50	60-70	85-100	120-150	200-300
Flash, PMCC, °F min.	460	450	440	425	400
Penetration Ratio, % min.	25	25	25	25	25
SF Viscosity at 275° F, Seconds	none	90-325	75-275	60-200	40-150
Sol in CCl_4, % min.	99.0	99.0	99.0	99.0	99.0
Thin Film Oven Test					
Ret. in Pen., % min.	52	50	45	42	37
Ductility, cm. min.	50	50	75	75	75

Prior to the discussion of the proposed specifications and the specification limits included therein it was agreed by the group that a discussion of the various test methods should be pursued primarily with respect to their significance and practicability. A mimeographed list of "Notes on Paving Asphalt Testing Procedures Used in Proposed Pacific Coast Uniform Specifications" was then distributed to the delegates by industry representatives. This item is attached to the minutes as appendix "A".

Following is a summary of the discussions of the various test methods:

1. Pensky-Marten's Flash Test. This test was selected as a substitute for the Cleveland Open Cup Test primarily because it incorporates a stirring action as an integral part of the test procedure. The stirring action is considered desirable in overcoming false readings of flash point due to skin-formers, such as the silicone compounds which are sometimes added to asphalt as anti-foaming agents. Moreover, due to the fact that the Pensky-Marten's testing device is of the closed cup type, the flash point value obtained is not affected by drafts in the laboratory. On the other hand, the closed cup arrangement would result in the detection of trace contamination, which may not have any adverse effects on either asphalt quality or performance. Also, a correction in flash point is necessary if the test is conducted at high altitudes.

   The Pensky-Marten's Flash is not directly related to COC flash. It was agreed that in all cases the Pensky Marten Flash Point is lower than the COC flash. Nevada has noted approximately 30°F difference in the 85-100 grade and 40°F difference in the 120-150 grade. One sample in the Zaca-Wigmore cooperative test series, involving a total of sixteen (16) samples, had a difference of almost 100°F.

   Due to initial cost of equipment and care required in running the test, the Pensky-Marten's Flash is more costly to run. It has about the same reproducibility as the COC.

   The following motion was then made by Mr. Hveem:

   > MOVED, that it is the consensus of the group that the Pensky-Marten's Test is the preferred method for determining the flash-point of paving grade asphalts.

   The motion was seconded and passed. (The Bureau of Public Roads and Corps of Engineers went on record as "not voting".)

2. Penetration Ratio. The penetration ratio is determined by a ratio of penetration test values at 39.2°F to 77°F and is a measure of the temperature susceptibility of the asphalt, especially at low temperatures. A minimum value is generally set to avoid pavement brittleness at low temperatures.

It was agreed that time and temperature controls were of extreme importance in this test. Thermostatically controlled temperature baths are an absolute necessity, particularly at the 39.2°F temperature. Specifications for a low temperature bath considered adequate by the asphalt industry are available from The Asphalt Institute office in San Francisco.

Reproducibility of this test was discussed. It has been found that reproducibility of the penetration test at low temperatures was greatly affected by the condition of the needle. Some experimental work by laboratories on the Pacific Coast has resulted in the manufacture of a supply of special needles by the Van Kuren Company for further experimentation. A desire to secure a set of new needles was expressed by the following agencies:

Agency	No. of Needles
State of Arizona	1
State of California	8
State of Idaho	1
State of Nevada	1
California Research Corporation	6
Douglas Oil Company of California	4
Envoy Petroleum Company	2
Macmillan Petroleum Company	2
Richfield Oil Corporation	2
Seaside Oil Company	2
Shell Oil Company	2
Union Oil Company of California	4
TOTAL	35

Arrangements will be made to purchase these needles by a representative of the asphalt industry.

Mr. Hveem suggested the possibility of using a "cylindrical" needle rather than the conventional "tapered" needle because it could be more easily and accurately manufactured to closer tolerances. Mr. Scott volunteered to conduct independent studies with Mr. Hveem on such needles if Mr. Hveem would determine necessary dimensions, tolerances and character of steel to be used.

It was generally agreed that the penetration ratio test had significance. The South Pacific Division of the Corps of Engineers is currently investigating the method and feels that they need more experience with the test.

Some discussion was had on the new Sliding Plate Microviscometer as a better and more convenient measure of asphalt viscosity. This apparatus is in production and will soon be on the market. Mr. Lettier agreed to distribute information on this device, including cost, to all agencies represented at the conference.

3. High Temperature Viscosity (275°F). The requirement for a certain viscosity range at the elevated temperature of 275°F is to insure good workability at mixing and laying temperatures and desirable film thicknesses. It also precludes the addition of any agent to the asphalt which might injure the flash but which would raise the mixing temperature to a point where damage to the asphalt might result in the mixing process.

In general, the Saybolt-Furol equipment is used in this test. However, some laboratories are using a capillary viscometer because of its greater ease of handling and greater accuracy. Mr. Lettier offered to distribute literature and cost data on the Zeitfuch instrument to the delegates subsequent to the meeting. It was also suggested that the ASTM procedures for determining viscosity with capillary instruments and for conversion of the determined units in centistokes to Saybolt-Furol be accepted as a test method.

Preference for a high temperature viscosity test at 300°F was expressed by the South Pacific Division representatives. Some discussion was held on this point.

Most user agencies were not too familiar with this test and requested additional time for study. The test is in the current asphalt specifications of the California Division of Highways and is acceptable to the asphalt industry.

4. Solubility in CCl_4. The solubility test prevents the use of filler materials to modify the asphalt to meet other test requirements. Substitution of some other non-toxic solvent for CCl_4 was recommended. Said solvent should be effective and free from hazards.

A motion was made by Mr. Hveem, as follows:

> MOVED, that the asphalt industry on the Pacific Coast investigate solvents to determine which is the best all-around solvent for the solubility test and to transmit its recommendations to the user agencies.

Motion seconded and passed, unanimously.

This test was considered acceptable by all agencies.

5. Bureau of Public Roads, Thin Film Oven Test. This test measures retention of penetration test values expressed as a per cent of original penetration test values after exposure in an oven at 325°F for 5 hours in a film thickness of approximately 1/8 inch. Asphalts which tend to retain their penetration values will not harden excessively during the mixing operation in an asphalt plant.

Ductility of the asphalt after exposure may also be determined. Cracked materials, excessively air-blown or waxy asphalts will have low ductilities after such exposure.

According to South Pacific Division representatives, early embrittlement failures on Corps of Engineer projects have been eliminated by this test method. They feel the test to be very significant. Similar views were held by Bureau of Public Roads representatives. However, only the 85-100 penetration grades have been investigated extensively.

California representatives believed the test method indicative of hot-mix hardening only and not an indication of the cold temperature behavior of the asphalt.

Many factors affect the reproducibility of this test method. It was generally conceded that a great deal of improvement in oven design and details of procedure were needed to make the test results reproducible between laboratories. Mr. Winneford agreed to distribute, subsequent to the meeting, copies of his paper on "Reproducibility of Oven Heat Tests for Paving Asphalts" to be presented at the September 1956 meeting of A.S.T.M. in Los Angeles. This paper evaluates the effects of a number of oven variables on the resulting test values on the exposed asphalt.

In particular, present procedures need substantial improvement in two areas, as follows:

(a) Standardization and calibration of ovens.
(b) Method of preparing and handling samples.

In connection with (a) above, Mr. Hveem suggested the possible use of a pan of volatile material whose rate of evaporation loss would be used to evaluate the oven's capacity for weathering and its circulation of air. It was recommended that industry take this suggestion under advisement.

It was the consensus of the group that the best current test procedure for running the BPR Thin Film Oven Test was that as modified by the State of California. A motion was made, as follows:

> MOVED, that the procedure for the BPR Thin Film Oven Test given as test method No. 337-A in the Materials Manual of the California Division of Highways be adopted as an interim test method.

Motion seconded and passed. Mr. Hveem agreed to mail copies of this test procedure to all agencies represented at the conference who have not already received a copy.

It was noted that an A.S.T.M. committee was working on a test procedure for adoption as an A.S.T.M. standard.

6. Other Tests. Several other asphalt tests, not included as part of the uniform asphalt specification recommended by industry were discussed, as follows:

a. Spot Tests. The Oliensis and Heptane-Xylene spot tests were adopted for paving asphalts primarily to preclude the use of cracked materials in pavement construction. Industry representatives believe the test has outlived its usefulness and that other tests afford protection against cracked materials, such as the ductility after the Thin Film Oven exposure. There is also evidence which indicates that a positive spot test result does not necessarily indicate an unsatisfactory material.

Representatives of the user agencies were hesitant about abandoning the spot test without assurances, supported by sufficient data, that excessively cracked materials would be eliminated by other test requirements. Mr. Hveem stated that California would consider dropping the Heptane-Xylene test if industry could prove that cracked materials fail the Thin Film Test. Industry indicated it would work toward that end.

As an interim measure, industry proposed as a compromise the requirement of "Negative Spot" with a standard solvent composed of 35% Xylene and 65% Heptane. This is the same specification limit of the Heptane-Xylene test which has been in use on the Pacific Coast for many years. Recently the California Division of Highways adopted a maximum Xylene equivalent of 30%, which the manufacturers do not favor.

No agreement was reached in this matter.

b. Loss on Heating, Thin Film Oven Test. This test requirement is considered of little significance by industry due to the fact that it is not a reproducible value and, in some cases, the sample may gain in weight. Also, industry felt that the Pensky-Marten Flash Point test better provides the information desired. Industry also pointed out that elimination of a loss in weight determination precludes the need for a re-heating operation in the determination of penetration and ductility of residue. This would speed up the Thin Film Oven Test and no doubt improve its reproducibility to some degree.

The South Pacific Division has been specifying a maximum per cent weight loss requirement with this test for about two (2) years. They believe the loss on heating value is an indication of the source of the asphalt. Industry questions the need for identifying the source of the asphalt as the intent of specifications is to define a material which will behave satisfactorily under the particular job and field exposure conditions. Moreover, industry felt that the manner of processing is of

equal or greater importance than source of material in obtaining the best quality product.

No agreement was reached.

7. Reactions of Consumers to Industry-Proposed Specification Limits

All consumer agencies agreed in principle with the philosophy and intent of the industry-proposed asphalt specification. Moreover, the sliding scale arrangement of test limits to conform with the natural properties of asphalts received general acceptance as a sound basis for establishing realistic test limits.

The Bureau of Public Roads representatives stated that their recommended test limit of 50 minimum for retention in penetration of the softer grades might be too high but that they were uncertain as to what limit should be set.

Arizona, Idaho and Washington representatives indicated that they lacked sufficient data and experience with the new test methods to discuss specification limits at this time. However, they are engaged in considerable experimental work.

The State of California adopted a new specification recently (March 1, 1956) which was arrived at over a period of years, in full cooperation with the asphalt industry on the Pacific Coast. California indicated it would not consider changing specifications until the end of the year; meanwhile, it would take under advisement the latest industry recommendations for a uniform specification which could be used throughout the six Western states.

California felt that the proposed high temperature viscosity limits were too broad. After discussion, industry offered the following revision:

Grade	60/70	85/100	120/150	200/300
Viscosity at 275°F SSF	100-325	85-275	70-200	50-150

Mr. Hveem also stated that he believed the retention in penetration for the 200-300 grade should not be less than 40.

Nevada is presently using the new specifications of the California Division of Highways. Data and experience are being accumulated.

Oregon offered the following suggestions regarding the proposed asphalt specifications:

(a) Retention of penetration values after Thin Film Test should be changed to:

48 for 85/100 grade
45 for 120/150 grade
40 for 200/300 grade

(b) High Temperature Viscosity limits should be changed to:

90-300 for 60/70 grade
75-250 for 85/100 grade
40-130 for 200/300 grade

8. Additional Proposals

Because of lack of agreement and as a result of the discussions held, the asphalt industry offered for consideration two possible additions to the proposed specification which might make the specifications more acceptable, as follows:

(a) Inclusion of a spot test requirement, provided a standard solution of 35% Xylene and 65% Heptane is used with a "pass" limit.

(b) Inclusion of a weight loss requirement in the Thin Film Oven Test with the following limits:

Grade of Asphalt	40/50	60/70	85/100	120/150	200/300
Weight Loss, % Max.	.75	.80	.85	1.00	1.75

After considerable discussion, it was agreed that the user agencies were not prepared to take action on the uniform asphalt specification preposed by industry. Time was needed to study the proposal and conduct investigations and related experimental work. The following motion was then made:

> MOVED, that a second conference be held some time during late 1956 or early 1957 to discuss further and take possible action on a uniform asphalt specification agreeable to both consumer and industry.

Motion seconded and passed.

9. Adjournment

The meeting was adjourned at 4:30 P.M. on Tuesday, June 26, 1956

Appendix A

NOTES ON PAVING ASPHALT TESTING PROCEDURES USED IN PROPOSED PACIFIC COAST UNIFORM SPECIFICATIONS

The manufacturers recognize in proposing the new Pacific Coast paving asphalts that they are using test methods which are not completely standardized for testing paving asphalts. Some of the comments or precautions involving these tests follow:

Flash Point, Pensky-Martens

The cup and head of the flash apparatus should be thoroughly washed with solvent and thoroughly dried over a hot plate or burner after each test. The heating rate and frequency of testing for flash point must be as specified.

Penetration at 39.2°F

Temperatures in the bath and transfer dish must be held within $\pm$ 0.1°F in order to assure accuracy. This requires careful thermostatic control of circulating water.

Needles having near perfect dimensions and which are very smooth at the point give most consistent results. Specifications for such needles are being developed in cooperation with ASTM and the Bureau of Standards.

Viscosity at 275°F

The viscosity can be determined with the Saybolt Furol instrument. Most manufacturers feel that a back flow (e.g., Zeitfuchs) capillary viscometer gives greater precision and reproducibility. Data from this instrument are readily converted into Saybolt Furol seconds.

Solubility in CCl_4

CCl_4 is preferred to CS_2 because of the greater safety in handling.

Thin Film Oven Test and Attendant Tests

Many manufacturers feel that the California Division of Highways modification of the original Bureau of Public Roads Thin Film Oven Test method is the more precise and reproducible. The California method has a better procedure for reheating the sample prior to pouring for penetration and ductility of residue. However, the California procedure probably gives lower penetrations and ductilities of residue than does the original Bureau of Public Roads method.

The method of heating and ventilation between different ovens all meeting the present oven specifications seems to have an influence on results of the Thin Film Oven Test. This point is under investigation.