AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

AASHTO

COMMITTEE ON MATERIALS & PAVEMENTS

2018 Annual Meeting – Cincinnati, OH
Wednesday August 8, 2018
8:00 – 10:00 AM EST

TECHNICAL SUBCOMMITTEE 1c
Aggregates

I. Call to Order and Opening Remarks

A. Brief summary of activities *(to ensure all attendees up to speed)*

II. Roll Call

First Name	Last Name	Company	Member Type	Present
Donald	Streeter	New York State Department of Transportation	Voting	
Jim	Trepanier	Illinois Department of Transportation	Voting	
Michael	Benson	Arkansas Department of Transportation	Voting	
Mickey	Cronin	Ohio Department of Transportation	Voting	
Richard	Barezinsky	Kansas Department of Transportation	Voting	
Robert	Lauzon	Connecticut Department of Transportation	Voting	
Magdy	Beshara	Saskatchewan Ministry of Highways and Infrastructure	Voting	
Michael	Doran	Tennessee Department of Transportation	Voting	
Becca	Lane	Ontario Ministry Of Transportation	Voting	
Sejal	Barot	Maryland Department of Transportation	Voting	
Darin	Tedford	Nevada Department of Transportation	Voting	
Charles	Babish	Virginia Department of Transportation	Voting	
Mark	Felag	Rhode Island Department of Transportation	Voting	
Michael	San Angelo	Alaska Department of Transportation and Public Facilities	Voting	
Mike	Santi	Idaho Transportation Department	Voting	

Peter	Wu	Georgia Department of Transportation	Voting	
Wasi	Khan	District of Columbia Department of Transportation	Voting	
Steven	Ingram	Alabama Department of Transportation	Voting	
Rick	Bradbury	Maine Department of Transportation	Voting	
Paul	Farley	West Virginia Department of Transportation	Voting	
Paul	Burch	Arizona Department of Transportation	Voting	
John	Staton	Michigan Department of Transportation	Voting	
Mick	Syslo	Nebraska Department of Transportation	Voting	
John	Shoucair	Florida Department of Transportation	Voting	
Curt	Turgeon	Minnesota Department of Transportation	Voting	
Anne	Holt	Ontario Ministry Of Transportation	Non-Voting	
Carole Anne	MacDonald	Ontario Ministry Of Transportation	Non-Voting	
Cecil	Jones	Diversified Engineering Services, Inc.	Non-Voting	
Chad	Clawson	AASHTO	Non-Voting	
David	Savage	Construction Materials Engineering Council	Non-Voting	
Desna	Bergold	D B Consulting and Associates, LLC	Non-Voting	
Dick	Reaves	Troxler Electronic Laboratories, Inc.	Non-Voting	
James	Willis	National Asphalt Pavement Association	Non-Voting	
John	Giannini	Connecticut Department of Transportation	Non-Voting	
Katheryn	Malusky	AASHTO	Non-Voting	
Robin	Graves	Vulcan Materials Company	Non-Voting	
Tim	Aschenbrener	Federal Highway Administration	Non-Voting	
Jan	Prowell	Cement and Concrete Reference Laboratory	Non-Voting	
John	Malusky	AASHTO Re:source	Non-Voting	
Matthew	Bluman	AASHTO Re:source	Non-Voting	
Amanda	Moser	AASHTO Re:source	Non-Voting	
Gregory	Uherek	AASHTO Re:source	Non-Voting	
Steven	Lenker	AASHTO Re:source	Non-Voting	

Maria	Knake	AASHTO Re:source	Non-Voting	
Christopher	Abadie	Pine Bluff Sand and Gravel Co.	Non-Voting	
Georgene	Geary	GGfGA Engineering, LLC	Non-Voting	
Woody	Hood	Maryland Department of Transportation	Non-Voting	
Sean	Parker	Oregon Department of Transportation	Non-Voting	
Jasmine	Gilmore	AASHTO Re:source	None	
Pete	Holter	AASHTO Re:source	None	

III. Approval of Technical Subcommittee Minutes

Meeting date: Midyear Webinar January 30th, 2018 (Attachment #1)
Motion to approve by:
2nd Motion to approve by:

IV. Old Business

A. COMP Ballot Items
   i. T 2 was reclassified as a standard practice and published as R 90, with a title change. New title is Sampling Aggregate Products.
   ii. T 113 was revised, with significant changes to Sections 6, 7, and 8. Section 5.1.2 and reference to kerosene heavy liquid removed.
   iii. TP 81 was adopted as a full standard test and published as T 381.
   iv. PP 64 was adopted as a full standard practice and published as R 91.

B. TS Ballots
   i. M 6, M 43, T 11, T 19M/T 19, T 27, T 85, T 326, and T 335 were reconfirmed for 4 years
   ii. TP 120, first published in 2016, was reconfirmed for 2 years

C. Task Force Reports

- TF 11-01: T112 Revision (KS – Rick Barezinsky, NE, AK, AMRL)
- TF 13-01: AIMS Standards, TP81 & PP64, (FL – John Shoucair, OH, AZ, TRB)
- TF 15-03: Centrifuge method for LWA (LA, FL, KS, Jeff Speck)
  - Draft provisional received from the Task Force for Tech Section Ballot

- TF 17-01: Friction Tester (MD –Sejal Barot, TN, LA, FL, WV, FHWA)

V. New Business

A. Research Proposals
   1. Quick turnaround RPS- None Received
   2. Full NCHRP RPS- None Received

B. AASHTO Technical Service Programs Items
   i. AASHTO Re:Source- John Malusky will provide a follow-up to the aggregate washing survey with the results of the most recent Fine Aggregate Proficiency Sample Round

C. NCHRP Issues
   i. None Received

D. Correspondence, calls, meetings

E. Presentation by Industry/Academia

F. Proposed New Standards
   i. None Received

G. Proposed New Task Forces

H. Standards Requiring Reconfirmation
   i. M 195-11 (2015)
   ii. T 021M/T 21-15
   iii. T 096-02 (2015)
   iv. T 210-15
   v. T 330-07 (2015)

I. COMP Ballot Items (including any ASTM changes/equivalencies/harmonization)
   i. Review revisions submitted for T 27 by WAQTC (attached)

VI. Open Discussion

VII. Adjourn

AASHTO
THE VOICE OF TRANSPORTATION
SUBCOMMITTEE ON MATERIALS

COMMITTEE ON MATERIALS and PAVEMENTS

Mid-Year Webinar Meeting Minutes
Tuesday January 30, 2018
1:00 PM – 3:00 PM CST

TECHNICAL SECTION 1C
AGGREGATES

I. Call to Order and Opening Remarks

- Chair: Scott Seiter
- Vice Chair: vacant

II. Roll Call/Roster

- Attendees: send an email to signify attendance

Voting Members

Name	State	Present
Scott Seiter (Chair)	Oklahoma	**X**
(V-Chair)		
Steven Ingram	Alabama	**X**
Michael San Angelo	Alaska	
Paul Burch	Arizona	**X**
Michael Benson	Arkansas	**X**
Robert Lauzon	Connecticut	
Wasi Khan	District of Columbia	
John Shoucair	Florida	**X**
Peter Wu	Georgia	
Mike Santi	Idaho	
Jim Trepanier	Illinois	
Rick Barezinshy	Kansas	
Rick Bradbury	Maine	**X**
Sejal Barot	Maryland	
John Staton	Michigan	
Curt Turgeon	Minnesota	
Mick Syslo	Nebraska	
Darin Tedford	Nevada	**X**
Donald Streeter	New York	**X**
Mickey Cronin	Ohio	**X**
Greg Stellmach	Oregon	
Mark Felag	Rhode Island	
Michael Doran	Tennessee	**X**
Darren Hazlett	Texas	
Andy Babish	Virginia	**X**
Paul Farley	West Virginia	

Becca Lane	Ontario	
Magdy Beshara	Saskatchewan	

Non-voting Members, Friends, Liaisons

Name	Affiliation	Present
David Savage (friend)	CMEC	
Robin Graves (friend)	Vulcan	
Jan Prowell (friend)	CCRL	
Desna Bergold (friend)	D B Consulting	
Cecil Jones (friend)	Diversified Engr.	**X**
James Willis (friend)	NAPA	
Dick Reaves (friend)	Troxler	
Christopher Abadie (friend)	Pine Bluff Sand & Gr.	
Georgene Geary	GGfGA Engr.	**X**
Tim Aschenbrener (ex Officio)	FHWA	
Evan Rothblatt (liaison)	AASHTO	
John Malusky (liaison)	AASHTO re-source	**X**
Matthew Bluman (liaison)	AASHTO re-source	**X**
Amanda Moser (member)	AASHTO re-source	
Greg Uherek (member)	AASHTO re-source	
Steven Lenker (member)	AASHTO re-source	
Maria Knake (member)	AASHTO re-source	
Jasmine Gilmore (other)	AASHTO re-source	
Pete Holter (other)	AASHTO re-source	
John Giannini	Connecticut	
Woody Hood	Maryland	
Sean Parker	Oregon	
Anne Holt	Ontario	
Carole Ann MacDonald	Ontario	

III. Approval of Technical Section Minutes

- Wednesday August 9, 2017 meeting – Motion to approve: FL, Second: AL

IV. Old Business

- 2017 SOM Ballot 11/8/17 – 1/5/18 - Results:

Item Number:	**5 – This was the second go for T2.**
Description:	COMP ballot item to revise T 2 as a standard practice in AASHTO format, R-XX. This ballot includes revisions to address comments from previous technical section ballots.
Decisions:	Yes: 47, No: 1, No Vote: 4
Negative vote with comments:	
Kentucky Transportation Cabinet (Allen H Myers) (allen.myers@ky.gov)	We agree with Maine regarding Section 5.7.2 that a minimum of three equal increments should be required rather than "repeat as necessary." We prefer wording similar to that in

	Section 5.6.3. This standard practice needs a definition for nominal-maximum size. Also require the material size in Section 6.2.4. **Scott spoke to Kentucky and they withdrew their negative. Michael Black indicated they are using a state method now, so their concerns are no more. He stressed the reasoning for preferring a minimum of 3 increments over the 'repeat as necessary'. Georgene indicated that asphalt sampling has added similar wording (Georgene will forward along that wording). This will be pushed through as is, then the issue can be added the next go around. This will be published as an R standard.**
Affirmative votes with comments:	
Oregon Department of Transportation (Greg Frank Stellmach)	Editorial - AASHTO standard M323 should be called out in Section 2.1 (Typo). The title is correct but the number is incorrect.
Virginia Department of Transportation (Charles A. Babish) (andy.babish@vdot.virginia.gov)	This is an aggregate sampling procedure. In Sections 3.1 and 5.1, should specification language ("shall") be used? Agree otherwise.
Illinois Department of Transportation (Brian Pfeifer) (brian.pfeifer@illinois.gov)	2.1, Should be M 323 (not 232) 5.7.2, recommend separation medium such as metal plate, to prevent contamination from underlying material
Wisconsin Department of Transportation (Barry C Paye) (barry.paye@dot.wi.gov)	Page 15, Section 5.3.1 - Do we want to remove all the material from the belt, or a representative sample? There could be a wet pile, leaving some fines on the belt constantly during operation. Removal of all the fines would result in a non-representative sample. Page 16, Section 5.7.1 - consider revising to say "...before compacting and watering." Watering for compaction can impact the gradation by washing away needed fines.
Item Number:	**6 – This was a major rewrite by WAQTC**
Description:	COMP ballot item to revise T 113, Lightweight Particles in Aggregate. This is a ballot item submitted by WAQTC updating the standard with significant revisions to sections 6, 7, 8. Other revisions include removing section 5.1.2 and the reference to the kerosene heavy liquid.
Decisions:	Yes: 47, No: 1, No Vote: 4
Negative vote with comments:	
Arkansas Department of Transportation (Michael C Benson) (michael.benson@ardot.gov)	ℜ• Section 3. indicates two specific gravity ranges, 2.0 and 2.40, but does not include any direction in the method as to how to formulate the heavy liquids necessary for the separation. ℜ• Section 5. needs to include a target specific gravity concentration for the solutions or additional information concerning the required concentration. The specific gravity

	of the liquid needs to be determined initially. Section 4.6 includes a hydrometer or glassware and balance capable of measuring the specific gravity but it is assumed in the method that the analyst understands how to determine the specific gravity with these items. ℜ• Fine aggregate sample size is confusing. Section 6.1 indicates that a minimum 200 g sample passing the No. 4 should be obtained but in Section 6.3.2. that sample is screened over a No.50 which can reduce the sample size used for the lightweight determination significantly. ℜ• Section 6.2. includes the requirements of drying the test sample to constant mass, but lacks details. While constant mass is an understandable term for many it may not be for some. Recommend that the Section be changed to include cooling and weighing steps. ℜ• Changing the timing in Section 6.2. to allow for drying times beyond 20 minutes is recommended. Inclusion of "at least an additional 20 minutes" would allow for some flexibility yet still maintain the intent. ℜ• Section 6.3.2. appears to indicate use of a mechanical shaker only while AASHTO T 27 allows either. Allowance should be made for both. ℜ• Determination of the mass of the fine aggregate sample (W_2) in Section 6.3.3 to a lower decimal place than 0.1 g would allow for a more precise determination, while practically maintains that the mass of the coarse aggregate sample should be left as indicated. ℜ• Allowing for a fine aggregate sample to be brought to SSD condition by the steps formally indicated in 9.0.0 should still be permitted. The steps in T 84 are designed for a much larger sample volume than required in this test and are not practical for this size of sample. Why is it even necessary to bring these materials to SSD condition for this test? ℜ• Introduction of the heavy liquid solution into the aggregate sample should also be allowed in Section 7.1.1. and 7.2.1 not just the sample to the liquid. ℜ• Abbreviation for seconds should be "s" in Section 7.1.2. and 7.2.2or recommend spell out the word. ℜ• Section 7.1.3. requires the material to sit undisturbed for 1 to 2 minutes. This step should allow for the use of longer standing times in case of issues with settling. ℜ• Section 7.1.6 references drying the lightweight particles to constant mass but does not define what is considered constant mass. Note that the mass (W_1) is only recorded to the nearest 0.1 g. ℜ• For Class fine aggregate in AASHTO M 6, a maximum of 0.25% coal and lignite determined by this method is required. It would seem appropriate that the lightweight particles mass (W_1) would be recorded to at least 0.01 g and possibly even more decimal places.

	ℜ• The sieve stated in Section 7.2.5 is incorrect and should be a 300-Âµm (No.50). Maintaining the specific gravity of the heavy liquid at all times during the test is impractical but the only source of dilution in the method would be from the water included for SSD. If this is what is causing the heavy liquid to be out of tolerance more than Â±0.01 it would not be possible to keep it in. Recommend removal of this requirement. **Arkansas has agreed to withdraw its negative. It's not a common method for them. WAQTC wishes to work with Arkansas to continue addressing these comments.**
Affirmative votes with comments:	
Kentucky Transportation Cabinet (Allen H Myers) (allen.myers@ky.gov)	In the first sentence of Section 6.1, the reference to AASHTO T 2 will need to be modified if T 2 is changed to be a standard practice.
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 will need to be updated to the new standard that we are voting on this year.
Illinois Department of Transportation (Brian Pfeifer) (brian.pfeifer@illinois.gov)	6.4.3, recommend "Determine and record the cumulative mass of the material retained on the 4.75 (No. 4) and larger sieves..."
Missouri Department of Transportation (Brett Steven Trautman) (brett.trautman@modot.mo.gov)	Affirmative vote with the following comment: Sections 6.3.2 and 6.4.2 both mention using a mechanical shaker to screen the material prior to testing. Strongly recommend adding a note that would allow hand shaking to be used in-place of mechanical shaking. We believe hand shaking would work just as well as mechanical shaking and both options should be allowed. **Brett asked if this will be considered. WAQTC will contact Brett to work on this comment as well.**
Tennessee Department of Transportation (Brian K. Egan) (Brian.Egan@tn.gov)	Item #5 is proposing to be converted T2 to a R-XX. References will need to be revised also.
Wisconsin Department of Transportation (Barry C Paye) (barry.paye@dot.wi.gov)	Do we want to specify a drying temperature, or a maximum?
Item Number:	**7 – Moving provisional to full standard**
Description:	COMP ballot item to adopt TP 81 as a full standard, Determining Aggregate Shape Properties by Means of Digital Image Analysis.
Decisions:	Yes: 48, No: 0, No Vote: 4
Affirmative votes with comments:	

Arkansas Department of Transportation (Michael C Benson) (michael.benson@ardot.gov)	It would be helpful if the particle intermediate dimension was defined. The terminology section in TP 81 and PP 64 are the same except for the addition of the gradation, % passing and % retained, are not included in TP 81. The other slight difference is the use of numbers in sentences especially in the Terminology section and whether they are expressed in numerical or alpha format.
Item Number:	**8 – Moving provisional to full standard**
Description:	COMP ballot item to adopt PP 64 as a full standard, Determining Aggregate Source Shape Values from Digital Image Analysis Shape Properties.
Decisions:	Yes: 48, No: 0, No Vote: 4
Affirmative votes with comments:	
Arkansas Department of Transportation (Michael C Benson) (michael.benson@ardot.gov)	There is an issue between how %R is expressed in the two different sections, 3.2.8.and 6.2. This needs to be resolved. Minimal a recommendation that the meaning of sieve x+1 should be defined. This method also has some inconsistency as to how numerical values are expressed in Section 3. Terminology with some expressed numerically while others in alpha format.

- Technical Section Reconfirmation Ballot 11/14/17 – 1/5/18 - Results

Item Number:	**1**
Description:	Reconfirm M6
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	This document makes references to T 2 in a few locations, In rolling ballot 3 it has been proposed to change T 2 to a Rxx. Do we need to be update this document now?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	**2**
Description:	Reconfirm M43
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	Should the ASTM designation in this document be updated to reflect current ASTM standard updated 2017 ?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	**3**
Description:	Reconfirm T11
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	

Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	Should the ASTM designation in this document be updated to reflect current ASTM standard updated 2017 ?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	**4**
Description:	Reconfirm T19M/T19
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	The version of ASTM C29/C29M -09 reference in this document has been updated in 2017 with changes. Do we need to update the reference in this document to reflect this update?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	**5**
Description:	Reconfirm T27
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	The version of ASTM C136/C136M -06 reference in this document has been updated in 2014 with changes. Do we need to update the reference in this document to reflect this update?
Kansas Department of Transportation (Richard A Barezinsky) (rick.barezinsky@ks.gov)	10.2: Needs to include verbiage when using percent retained. e.g. The percent retained on the #200 sieve is reported to the nearest 0.1 percent when less than 90 percent is retained on the #200 sieve.
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	**6**
Description:	Reconfirm T85
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	The version of ASTM C127/C127M -12 reference in this document has been updated in 2015 no changes in update identified. Do we need to update the reference in this document to reflect this update?
Illinois Department of Transportation (Jim Trepanier) (james.trepanier@illinois.gov)	In Article 6.2, if the basket was specified to be a #10 instead of #6 or finer, T 84 would not need to be run as specified in last sentence of Article 7.2.
Oregon Department of Transportation (Greg Frank	Editorial - References to T2 should be updated to the new standard that is being voted on this year.

Stellmach) (greg.f.stellmach@odot.state.or.us)	
Item Number:	**7**
Description:	Reconfirm T326
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Kansas Department of Transportation (Richard A Barezinsky) (rick.barezinsky@ks.gov)	9.2. Just a comment It is difficult to strike coarse aggregate level with the rim of the cylindrical measure. If all rock is below the rim, then a high U-value is obtained that does not represent the Uncompacted voids in the coarse aggregate. Kansas balances projections above and below the rim.
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	**8**
Description:	Reconfirm T335
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	**9**
Description:	Reconfirm TP120 – 2 Year extension
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Florida Department of Transportation (John P Shoucair) (john.shoucair@dot.state.fl.us)	Section 5.2 calls for either a metal or plastic container. Note 2 suggests that a clear pressure chamber will allow the operator to visually determine when all the entrapped air bubbles have been removed prior to pressurizing. Section 8.3 emphasizes that the operator should make sure that all large entrapped air bubbles are removed by rocking the chamber or tapping the sides of the chamber. Some aggregates will release small air bubbles during the filling process. Recommend Deleting Note 2 Revise Section 5.2 deleting the allowance of a metal container. Rewrite first sentence of Section 5.2: A clear plastic container of sufficient volume to hold 1000 g to 4500 g of normal weight carbonate aggregate.
New York State Department of Transportation (Donald Streeter) (donald.streeter@dot.ny.gov)	Does it matter is tap water or de-aired water is used? Is a temperature correction for the volume of water needed?

- Task Force Reports
  - TF 11-01: T112 Revision (KS – Rick Barezinsky, NE, AK, AASHTO) – no report
  - TF 13-01: AIMS Standards, TP81 & PP64, (FL – John Shoucair, OH, AZ, TRB)
    - John reported. Debated writing a spec for manufacturers to meet, but ended up realizing that the standard was being written for the AIMS device only. Indicated that an add-on laser has been produced to give the texture index, but this is a research only add on right now. The future can all for additional machines, but they'll have to specifically be written in to the standard with the algorithms to match.
    - This task force is officially closed.
  - TF 15-01: T11 Revision (WAQTC, NJ, ME, AASHTO)
    - Task force can be ended as goal was accomplished with adding line for mechanical washers.
    - This task force is officially closed.
  - TF 15-02: T104 Revision (TN, AASHTO)
    - The goal of this TF has been accomplished and revisions are ready to go out as TS Ballot.
    - Wording will be added to 4.1.1 to specify purity of the sodium or magnesium sulfate instead of relying on reagent grade.
    - John and Mike will compile the wording and get to Scott to get changes ready for ballott
  - TF 15-03: Centrifuge method for LWA (LA, FL, KS, Jeff Speck)
    - Draft provisional received from the Task Force for Tech Section Ballot
  - TF 16-01: T27 Sieving Sufficiency (ME – Rick Bradbury, AASHTO, Gilson, FL)
    - Waiting on technical panel to complete RFP to start research
    - The TF will be sunset until the project is complete, then possibly reconvene to complete revisions.
  - TF 17-01: Friction Tester (MD –Sejal Barot, TN, LA, FL, WV, FHWA)
    - There was a meeting last week to get things started.

V. New Business

- Research Proposals
  - None
- AASHTO re-source Items/Issues
  - Results of the T11 Wetting Agent Survey
    - Azelin Powell and John Malusky from AASHTO presented the results from the survey (presentation attached)
- NCHRP Issues
  - None
- Correspondence, calls, meetings, presentations:
  - **Email received 1/26/18 from Garth Newman:**

AASHTO Subcommittee on Materials
Tech Section 1c, Aggregate Materials
Scott Seiter, Chair
sseiter@odot.org

The WAQTC Executive Board is concerned about what will happen to many of AASHTO's 'C' standards. As we understand, AASHTO has been trying to eliminate standards that just reference a corresponding ASTM standard. The WAQTC membership believes that a number of these standards may have a large risk / cost for WAQTC member agencies if they were eliminated. The agencies would need to accept the ASTM standard or develop one.
We would like to know if the Technical Section (TS) has considered the what will become of the 'C' standards in its section, whether they will be discontinued, developed as an 'A' standard, or left as a 'C,' referencing the ASTM. This will allow the WAQTC to determine a course of action.
The 'C' standard in TS 1c is:

T 96, *Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.*
Thank you.
Garth Newman,
WAQTC QAC Chair

garth.newman@itd.idaho.gov
(208)334-8039

- Proposed New Standards -None

- Proposed New Task Forces -None

- Upcoming Technical Section Ballot Items
  - T 84 – to address numerous comments from previous ballot
  - T 85 – to address numerous comments from previous ballot
    - A few years ago there was a large study done on T84 and T85 to speed up the test and improve quality. There is ongoing work on the revisions produced from this study.
  - **T 11 – from task force 15-01**
  - **TP xx – from task force 15-03**

VI. Open Discussion

Scott discussed that he is going to be retiring at the end of February.
TS 1C is in need of volunteers for a Chair and Vice chair, so please let Scott or Evan know of your interest.

VII. Adjourn

- Motion to adjourn: ME, second: NY

TS 1C Aggregates Mid-Year Attendance		
Last	**First**	**State/Affiliation**
Seiter	Scott	OK (Chair)
Blackburn	Lyndi	AL
Benson	Michael	AR
Wilson	Craig	AZ
Budo	Leah	CA
Shoucair	John	FL
Cole	Neoma	GA
Black	Michael	KY
Dees	Amanda	KY
Morris	Justin	LA
Welderufael	Amanuel	MD
Bradbury	Richard	ME
Trautman	Brett	MO
Lamanilao	Roberto	MS
Hammons	Caleb	MS
Morrison	Clark	NC
Wutzke	Scott	ND
Dusseault	Charles	NH
Hanczaryk	Paul	NJ
Changlin	Pan	NV
Tedford	Darin	NV
Streeter	Don	NY
Heiser	Steven	NY
Doran	Michael	TN
Babish	Andy	VA
DeVol	Joe	WA
Jones	Cecil	Diversified Eng. Services (Friend)
Geary	Georgene	GGFGA Engineering (Friend)
Prowell	Jan	CCRL (Friend)

T11/C117 WASHING SURVEY

AZELIN POWELL, QUALITY ANALYST – AASHTO ACCREDITATION PROGRAM

JOHN MALUSKY, PROGRAM MANAGER – PROFICIENCY SAMPLE PROGRAM

AASHTO RE:SOURCE

RATIONALE FOR THE SURVEY

- Brought to our attention by AAP
- Suspended laboratories (5-10)
  - Multiple failures in regular rounds and extra samples (XPS) on the total % passing No. 50, 100, and 200 sieves.
  - Detailed Corrective Action Reports
    - Equipment - replaced sieves (checked), replaced shaker, checked sufficiency,
    - Training - checked procedure, calculations, etc.
    - Samples – ran multiple XPSs knowing what the results were and still getting poor results

Q1: WHAT METHOD IS MOST COMMONLY USED FOR YOUR AGF WASH?

(34 RESPONSES)

- Method A (Plain Water) : 20
- Method B (Wetting Agent) : 11
- Other : 3
  - Uses state specification or both methods

Q2: IF METHOD B, WHAT WETTING AGENT IS USED?

- Method A : 7
- Dish soap (Dawn, Joy, etc.): 19
- Sodium Hexametaphosphate : 3
- Other: 5
  - Calgon, Alconox Detergent (Sodium linear alkyl-aryl sulfonate)

Q3: WHAT TYPE OF WASH DO YOU PERFORM?

- Manual: 27
- Mechanical: 7

Q4: IF MECHANICAL, DO YOU PERFORM A COMPARISON BETWEEN MANUAL AND MECHANICAL?

- Yes (each aggregate source): 1
- Yes (only once, not varying material types): 6
- No (never compared): 5
- No (we don't mechanically wash): 22

Q5: WHEN MANUALLY WASHING, WHAT INSTRUMENT IS USED TO AGITATE THE MATERIAL?

- Hand: 9
- Metal spoon or spatula: 21
- Wooden spoon: 1
- Plastic spoon or spatula: 3

Q6: HOW LONG DO YOU MANUALLY WASH (APPROXIMATE)?

- 5 minutes or shorter and clear: 9
- 5-10 minutes and clear: 22
- 10-15 minutes and clear: 3

Q7: IF YOU MECHANICALLY WASH, HOW LONG DO YOU WASH?

- 5 minutes or shorter and clear: 4
- 5-10 minutes and clear: 7

Q8: WHAT MATERIAL IS YOUR WASHING BOWL MADE OF?

- Metal: 29
- Plastic: 4
- Glass: 1

Q9: IS THE AGGREGATE ALLOWED TO SOAK PRIOR TO WASHING?

- Yes (for both Methods A and B): 5
- Yes (Method A): 0
- Yes (Method B): 2
- No soaking : 27

Q10: IF YOU ALLOW THE MATERIAL TO SOAK, WHAT IS THE SOAK TIME?

- Various responses
  - 5 minutes
  - 10 minutes
  - Overnight
  - 12-15 hours

SUMMARY AND NEXT STEPS:

- Results of survey appear consistent
- Comparison between manual vs. mechanical washing
  - Currently, non-mandatory in AASHTO and ASTM
  - Should it be mandatory?
- Should soaking be precluded?
- Compare results between dish soap, sodium hex, and Calgon

QUESTIONS?

Standard Method of Test for

Sieve Analysis of Fine and Coarse Aggregates

AASHTO Designation: T 27-~~14~~[1]~~[1]~~18[1]

Technical Section: 1c, Aggregates

ASTM Designation: C136-06

AASHTO

American Association of State Highway and Transportation Officials
444 North Capitol Street N.W., Suite 249
Washington, D.C. 20001

Standard Method of Test for

Sieve Analysis of Fine and Coarse Aggregates

AASHTO Designation: T 27-~~14~~18[1]

Technical Section: 1c, Aggregates

ASTM Designation: C136-06

1. SCOPE

1.1. This method covers the determination of the particle size distribution of fine and coarse aggregates by sieving.

1.2. Some specifications for aggregates, which reference this method, contain grading requirements including both coarse and fine fractions. Instructions are included for sieve analysis of such aggregates.

1.3. The values stated in SI units are to be regarded as the standard. The values in parentheses are provided for information purposes only.

1.4. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user of this procedure to consult and establish appropriate safety and health practices and to determine the applicability of regulatory regulations prior to its use.*

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 231, Weighing Devices Used in the Testing of Materials
- R 76, Reducing Samples of Aggregate to Testing Size
- T 2, Sampling of Aggregates
- T 11, Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

2.2. *ASTM Standards*:

- C125, Standard Terminology Relating to Concrete and Concrete Aggregates
- C670, Standard Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
- E11-15, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

~~3.0. *IEEE/ASTM Standard:*~~

~~5.1.~~3.1. *Definitions*—For definitions of terms used in this standard, refer to ASTM C125.

~~6.~~4. SUMMARY OF METHOD

~~6.1.~~4.1. A sample of dry aggregate of known mass is separated through a series of sieves of progressively smaller openings for determination of particle size distribution.

~~7.~~5. SIGNIFICANCE AND USE

~~7.1.~~5.1. This method is used primarily to determine the grading of materials proposed for use as aggregates or being used as aggregates. The results are used to determine compliance of the particle size distribution with applicable specification requirements and to provide necessary data for control of the production of various aggregate products and mixtures containing aggregates. The data may also be useful in developing relationships concerning porosity and packing.

~~7.2.~~5.2. Accurate determination of material finer than the 75-µm (No. 200) sieve cannot be achieved by use of this method alone. T 11 for material finer than the 75-µm (No. 200) sieve by washing should be employed.

~~8.~~6. APPARATUS

~~8.1.~~6.1. *Balance*—The balance shall have sufficient capacity, be readable to 0.1 percent of the sample mass, or better, and conform to the requirements of M 231.

~~8.2.~~6.2. *Sieves*—The sieve cloth shall be mounted on substantial frames constructed in a manner that will prevent loss of material during sieving. The sieve cloth and standard sieve frames shall conform to the requirements of ASTM E11. Nonstandard sieve frames shall conform to the requirements of ASTM E11 as applicable.

Note 1—It is recommended that sieves mounted in frames larger than standard 203.2 mm (8 in.) diameter be used for testing coarse aggregate to reduce the possibility of overloading the sieves. See Section 8.3.

~~8.3.~~6.3. *Mechanical Sieve Shaker*—A mechanical sieving device, if used, shall create motion of the sieves to cause the particles to bounce, tumble, or otherwise turn so as to present different orientations to the sieving surface. The sieving action shall be such that the criterion for adequacy of sieving described in Section 8.4 is met in a reasonable time period.

Note 2—Use of a mechanical sieve shaker is recommended when the size of the sample is 20 kg (44 lb) or greater, and may be used for smaller samples, including fine aggregate. Excessive time (more than approximately 10 min) to achieve adequate sieving may result in degradation of the sample. The same mechanical sieve shaker may not be practical for all sizes of samples because the large sieving area needed for practical sieving of a large nominal size coarse aggregate very likely could result in loss of a portion of the sample if used for a smaller sample of coarse aggregate or fine aggregate.

~~8.4.~~6.4. *Oven*—An oven of appropriate size capable of maintaining a uniform temperature of 110 ± 5°C (230 ± 9°F).

~~9.~~7. SAMPLING

~~9.1.~~7.1. Sample the aggregate in accordance with T 2. The mass of the field sample shall be the mass shown in T 2 or four times the mass required in Sections 7.4 and 7.5 (except as modified in Section 7.6), whichever is greater.

~~9.2.~~7.2. Thoroughly mix the sample and reduce it to an amount suitable for testing using the applicable procedures described in R 76. The sample for test shall be the approximate mass desired when dry and shall be the end result of the reduction. Reduction to an exact predetermined mass shall not be permitted.

Note 3—Where sieve analysis, including determination of material finer than the 75-µm (No. 200) sieve, is the only testing proposed, the size of the sample may be reduced in the field to avoid shipping excessive quantities of extra material to the laboratory.

~~9.3.~~7.3. *Fine Aggregate*—The size of the test sample of aggregate, after drying, shall be 300 g minimum.

~~9.4.~~7.4. *Coarse Aggregate*—The mass of the test sample of coarse aggregate shall conform with the following:

Nominal Maximum Size Square Openings, mm (in.)	Minimum Mass of Test Sample, kg (lb)
9.5 ($^3/_8$)	1 (2)
12.5 ($^1/_2$)	2 (4)
19.0 ($^3/_4$)	5 (11)
25.0 (1)	10 (22)
37.5 (1$^1/_2$)	15 (33)
50 (2)	20 (44)
63 (2$^1/_2$)	35 (77)
75 (3)	60 (130)
90 (3$^1/_2$)	100 (220)
100 (4)	150 (330)
125 (5)	300 (660)

~~9.5.~~7.5. *Coarse and Fine Aggregates Mixtures*—The mass of the test sample of coarse and fine aggregate mixtures shall be the same as for coarse aggregate in Section 7.4.

~~9.6.~~7.6. *Samples of Large-Size Coarse Aggregate*—The size of sample required for aggregate with 50-mm (2-in.) nominal maximum size or larger is such as to preclude convenient sample reduction and testing as a unit except with large mechanical splitters and sieve shakers. As an option when such equipment is not available, instead of combining and mixing sample increments and then reducing the field sample to testing size, conduct the sieve analysis on a number of approximately equal sample increments such that the total mass tested conforms to the requirements of Section 7.4.

~~9.7.~~7.7. In the event that the amount of material finer than the 75-µm (No. 200) sieve is to be determined by T 11, use the procedure described in Section 7.7.1 or 7.7.2, whichever is applicable.

~~9.7.1.~~7.7.1. For aggregates with a nominal maximum size of 12.5 mm ($^1/_2$ in.) or less, use the same test sample for testing by T 11 and this method. First test the sample in accordance with T 11 through the final drying operation, then dry sieve the sample as stipulated in Sections 8.2 through 8.6 of this method.

~~9.7.2.~~7.7.2. For aggregates with a nominal maximum size greater than 12.5 mm ($^1/_2$ in.), a single test sample may be used as described in Section 7.7.1 or separate test samples may be used for T 11 and this method.

~~9.7.3.~~7.7.3. Where the specification requires determination of the total amount of material finer than the 75-µm (No. 200) sieve by washing and dry sieving, use the procedure described in Section 7.7.1.

~~10.~~8. PROCEDURE

~~10.1.~~8.1. If the test sample has not been subjected to testing by T 11, dry it to constant mass at a temperature of 110 ± 5°C (230 ± 9°F). Determine and record the mass of material that will be placed on the sieves to the accuracy of the balance as defined in Section 6.1.

Note 4—For control purposes, particularly where rapid results are desired, it is generally not necessary to dry coarse aggregate for the sieve analysis test. The results are little affected by the moisture content unless (1) the nominal maximum size is smaller than about 12.5 mm ($^1/_2$ in.), (2) the coarse aggregate contains appreciable material finer than 4.75 mm (No. 4), or (3) the coarse aggregate is highly absorptive (a lightweight aggregate, for example). Also, samples may be dried at the higher temperature associated with the use of hot plates without affecting results, provided steam escapes without generating pressures sufficient to fracture the particles, and temperatures are not so great as to cause chemical breakdown of the aggregate.

~~10.2.~~8.2. Select sieves with suitable openings to furnish the information required by the specifications covering the material to be tested. Use additional sieves as desired or necessary to provide other information, such as fineness modulus, or to regulate the amount of material on a sieve, Annex A2. Nest the sieves in order of decreasing size of opening from top to bottom and place the sample, or portion of the sample if it is to be sieved in more than one increment, on the top sieve. Agitate the sieves by hand or by mechanical apparatus for a sufficient period, established by trial or checked by measurement on the actual test sample, to meet the criterion for adequacy of sieving described in ~~Section 8.4~~Annex A1.

~~10.3.~~8.3. Limit the quantity of material on a given sieve so that all particles have opportunity to reach sieve openings a number of times during the sieving operation. ~~For sieves with openings smaller than~~

~~10.3.1.~~8.3.1. *Prevent an overload of material on an individual sieve by one or a combination of the following methods, ~~Annex A2~~refer to Table A1:~~:*

~~10.3.1.1.~~8.3.1.1. Insert an additional sieve with opening size intermediate between the sieve that may be and the sieve immediately above that sieve in the original set of sieves.

~~10.3.1.2.~~8.3.1.2. Split the sample into two or more portions, sieving each portion individually. Combine of the several portions retained on a specific sieve before calculating the percentage of the sample on the sieve.

~~10.3.1.3.~~ Use sieves having a larger frame size and providing greater sieving area.

~~10.3.1.4.~~8.3.1.4. In the case of coarse and fine aggregate mixtures, the portion of the sample finer than the (No. 4) sieve may be distributed among two or more sets of sieves to prevent overloading of individual sieves.

~~10.3.1.5.~~8.3.1.5. Alternatively, the portion finer than the 4.75-mm (No. 4) sieve may be reduced in size mechanical splitter according to R 76. If this procedure is followed, compute the mass of each size increment of the original sample as follows:

$$A = \frac{W_1}{W_2} \times B \qquad (1)$$

where:

A = mass of size increment on total sample basis;
W_1 = mass of fraction finer than 4.75-mm (No. 4) sieve in total sample;
W_2 = mass of reduced portion of material finer than 4.75-mm (No. 4) sieve actually sieved; and
B = mass of size increment in reduced portion sieved.

~~* Sieve frame dimensions in inch units: 8.0 in. diameter; 10.0 in. diameter; 12.0 in. diameter; 13.8 by 13.8 in. (14 by 14 in. nominal); 14.6 by~~

determining the smallest sieve opening through which each particle will pass by rotating the particles, if necessary, in order to determine whether they will pass through a particular opening; however, do not force particles to pass through an opening.

~~10.6.~~8.5. Determine the mass of each size increment on a scale or balance conforming to the requirements specified in Section 6.1 to the nearest 0.1 percent of the total original dry sample mass. The total mass of the material after sieving should check closely with the total original dry mass of the sample placed on the sieves. If the two amounts differ by more than 0.3 percent, based on the total original dry sample mass, the results should not be used for acceptance purposes.

~~11.~~9. CALCULATION

~~11.1.~~9.1. Calculate percentages passing, total percentages retained, or percentages in various size fractions to the nearest 0.1 percent on the basis of the total mass of the initial dry sample. If the same test sample was first tested by T 11, include the mass of material finer than 75-µm (No. 200) sieve by washing in the sieve analysis calculation; and use the total dry sample mass prior to washing in T 11 as the basis for calculating all the percentages.

~~11.1.1.~~9.1.1. When sample increments are tested as provided in Section 7.6, total the masses of the portion of the increments retained on each sieve, and use these masses to calculate the percentage as in Section 9.1.

~~11.2.~~9.2. Calculate the fineness modulus, when required, by adding the total percentages of material in the sample that are coarser than each of the following sieves (cumulative percentages retained), and dividing the sum by 100; 150 µm (No. 100), 300 µm (No. 50), 600 µm (No. 30), 1.18 mm (No. 16), 2.36 mm (No. 8), 4.75 mm (No. 4), 9.5 mm ($^3/_8$ in.), 19.0 mm ($^3/_4$ in.), 37.5 mm ($1^1/_2$ in.), and larger, increasing the ratio of 2 to 1.

~~12.~~10. REPORT

~~12.1.~~10.1. *Depending on the form of the specifications for use of the material under test, the report shall include one of the following*:

~~12.1.1.~~10.1.1. Total percentage of material passing each sieve, or

~~12.1.2.~~10.1.2. Total percentage of material retained on each sieve, or

~~12.1.3.~~10.1.3. Percentage of material retained between consecutive sieves.

~~12.2.~~10.2. Report percentages to the nearest whole number, except if the percentage passing the 75-µm (No. 200) sieve is less than 10 percent, it shall be reported to the nearest 0.1 percent.

~~12.3.~~10.3. Report the fineness modulus, when required, to the nearest 0.01.

~~13.~~11. PRECISION AND BIAS

~~13.1.~~11.1. *Precision*—The estimates of precision for this test method are listed in Table 2. The estimates are based on the results from the AASHTO Materials Reference Laboratory Proficiency Sample Program, with testing conducted by T 27 and ASTM C136. The data are based on the analyses of test results from 65 to 233 laboratories that tested 18 pairs of coarse aggregate proficiency test

samples, and test results from 74 to 222 laboratories that tested 17 pairs of fine aggregate proficiency test samples (Samples No. 21 through 90). The values in the table are given for different ranges of total percentage of aggregate passing a sieve.

Table 12—Estimates of Precision

	Total Percentage of Material Passing		Standard Deviation (1s), [a] %	Acceptable Range of Two Results (d2s), [a] %
Coarse Aggregate:[b]	100	≥95	0.32	0.9
Single-operator precision	<95	≥85	0.81	2.3
	<85	≥80	1.34	3.8
	<80	≥60	2.25	6.4
	<60	≥20	1.32	3.7
	<20	≥15	0.95	2.7
	<15	≥10	1.00	2.8
	<10	≥5	0.75	2.1
	<5	≥2	0.53	1.5
	<2	0	0.27	0.8
Multilaboratory precision	100	≥95	0.35	1.0
	<95	≥85	1.37	3.9
	<85	≥80	1.92	5.4
	<80	≥60	2.82	8.0
	<60	≥20	1.97	5.6
	<20	≥15	1.60	4.5
	<15	≥10	1.48	4.2
	<10	≥5	1.22	3.4
	<5	≥2	1.04	3.0
	<2	0	0.45	1.3
Fine Aggregate:				
Single-operator precision	100	≥95	0.26	0.7
	<95	≥60	0.55	1.6
	<60	≥20	0.83	2.4
	<20	≥15	0.54	1.5
	<15	≥10	0.36	1.0
	<10	≥2	0.37	1.1
	<2	0	0.14	0.4
Multilaboratory precision	100	≥95	0.23	0.6
	<95	≥60	0.77	2.2
	<60	≥20	1.41	4.0
	<20	≥15	1.10	3.1
	<15	≥10	0.73	2.1
	<10	≥2	0.65	1.8
	<2	0	0.31	0.9

[a] These numbers represent, respectively, the (1s) and (d2s) limits as described in ASTM C670.

[b] The precision estimates are based on aggregates with nominal maximum size of 19.0 mm (3/4 in.).

~~13.1.1.~~11.1.1. The precision values for Fine Aggregate in Table 2 are based on nominal 500-g test samples. Revision of ASTM C136 in 1994 permitted the fine aggregate test sample size to be 300 g minimum. Analysis of results of testing of 300-g and 500-g test samples from Aggregate Proficiency Test Samples 99 and 100 (Samples 99 and 100 were essentially identical) produced the precision values in Table 3, which indicate only minor differences due to test sample size.

Note 5~~6~~—The values for Fine Aggregate in Table 2 will be revised to reflect the 300-g test sample size when a sufficient number of Aggregate Proficiency Tests have been conducted using that sample size to provide reliable data.

Table 23—Precision Data for 300-g and 500-g Fine Aggregate Test Samples

Fine Aggregate Proficiency Sample	Sample	Number		Within Laboratory		Among Laboratories	
Test Result	Size	of Labs	Average	1s	d2s	1s	d2s
AASHTO T 27/ASTM C136:							
Total material passing the 4.75-mm (No. 4) sieve (%)	500 g	285	99.992	0.027	0.066	0.037	0.104
	300 g	276	99.990	0.021	0.060	0.042	0.117
Total material passing the 2.36-mm (No. 8) sieve (%)	500 g	281	84.10	0.43	1.21	0.63	1.76
	300 g	274	84.32	0.39	1.09	0.69	1.92
Total material passing the 1.18-mm (No. 16) sieve (%)	500 g	286	70.11	0.53	1.49	0.75	2.10
	300 g	272	70.00	0.62	1.74	0.76	2.12
Total material passing the 600-µm (No. 30) sieve (%)	500 g	287	48.54	0.75	2.10	1.33	3.73
	300 g	276	48.44	0.87	2.44	1.36	3.79
Total material passing the 300-µm (No. 50) sieve (%)	500 g	286	13.52	0.42	1.17	0.98	2.73
	300 g	275	13.51	0.45	1.25	0.99	2.76
Total material passing the 150-µm (No. 100) sieve (%)	500 g	287	2.55	0.15	0.42	0.37	1.03
	300 g	270	2.52	0.18	0.52	0.32	0.89
Total material passing the 75-µm (No. 200) sieve (%)	500 g	278	1.32	0.11	0.32	0.31	0.85
	300 g	266	1.30	0.14	0.39	0.31	0.85

13.2.11.2. *Bias*—Because there is no accepted reference material suitable for determining the bias in this test method, no statement on bias is made.

14.12. KEYWORDS

14.1.12.1. Aggregate gradation; fineness modulus.

1 Similar but not identical to ASTM C136-06.

ANNEX A

(Mandatory Information)

A1. TIME EVALUATION

A1.1. The minimum time requirement should be evaluated for each shaker at least annually by the following method:

A1.1.1. Shake the sample over nested sieves for approximately 10 minutes.

A1.1.2. Provide a snug-fitting pan and cover for each sieve and hold in a slightly inclined position in one hand.

A1.1.3. Hand-shake each sieve continuously for 60 s by striking the side of the sieve sharply and with an upward motion against the heel of the other hand at the rate of about 150 times per minute, turning the sieve about one sixth of a revolution at intervals of about 25 strokes.

A1.2. If more than 0.5 percent by mass of the total sample before sieving passes any sieve after one minute of continuous hand sieving adjust shaker time and re-check.

A1.3. In determining sieving time for sieve sizes larger than 4.75 mm (No. 4), limit the material on the sieve to a single layer of particles.

A1.4. If the size of the mounted testing sieves makes the described sieving motion impractical, use 203-mm (8-in.) diameter sieves to verify the adequacy of sieving.

A2. OVERLOAD DETERMINATION

A2.1. Do not exceed 7 kg/m^2 (4 g/in^2) of sieving surface with openings smaller than 4.75 mm (No. 4) at the completion of the sieving operation.

A2.2. Do not exceed the product of 2.5 x (sieve opening in mm) x (effective sieving area) for sieves with openings 4.75 mm (No. 4) and larger. This mass is shown in Table A1 for five sieve-frame dimensions in common use. Do not cause permanent deformation of the sieve cloth due to overloading.

Note A1—The 7 kg/m^2 (4 g/in.^{2}) amounts to 200 g for the usual 203-mm (8-in.) diameter sieve [with effective or clear sieving surface diameter of 190.5 mm (7 $^1/_2$ in.)] or 450 g for a 305-mm (12-in.) diameter sieve [with effective or clear sieving surface diameter of 292.1 mm (11 $^1/_2$ in.)]. The amount of material retained on a sieve may be regulated by: (1) the introduction of a sieve with larger openings immediately above the given sieve, (2) testing the sample in multiple increments, or (3) testing the sample over a nest of sieves with a larger sieve-frame dimension.

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Table A Error! Main Document Only.~~1~~—Maximum Allowable Mass of Material Retained on a Sieve, kg

Sieve Opening Size	Nominal Dimensions of Sieve[a]				
	203.2 mm, dia[b]	254 mm, dia[b]	304.8 mm, dia[b]	350 by 350, mm	372 by 580, mm
	Sieving Area, m^2				
	0.0285	0.0457	0.0670	0.1225	0.2158
125 mm (5 in.)	[c]	[c]	[c]	[c]	67.4
100 mm (4 in.)	[c]	[c]	[c]	30.6	53.9
90 mm ($3^1/_2$ in.)	[c]	[c]	15.1	27.6	48.5
75 mm (3 in.)	[c]	8.6	12.6	23.0	40.5
63 mm ($2^1/_2$ in.)	[c]	7.2	10.6	19.3	34.0
50 mm (2 in.)	3.6	5.7	8.4	15.3	27.0
37.5 mm ($1^1/_2$ in.)	2.7	4.3	6.3	11.5	20.2
25.0 mm (1 in.)	1.8	2.9	4.2	7.7	13.5
19.0 mm ($^3/_4$ in.)	1.4	2.2	3.2	5.8	10.2
12.5 mm ($^1/_2$ in.)	0.89	1.4	2.1	3.8	6.7
9.5 mm ($^3/_8$ in.)	0.67	1.1	1.6	2.9	5.1
4.75 mm (No. 4)	0.33	0.54	0.80	1.5	2.6

[a] Sieve-frame dimensions in inch units: 8.0-in. diameter; 10.0-in. diameter; 12.0-in. diameter; 13.8 by 13.8 in. (14 by 14 in. nominal); 14.6 by 22.8 in. (16 by 24 in. nominal).

[b] The sieve area for round sieves is based on an effective or clear diameter of 12.7 mm ($^1/_2$ in.) less than the nominal frame diameter because ASTM E11 permits the sealer between the sieve cloth and the frame to extend 6.35 mm ($^1/_4$ in.) over the sieve cloth. Thus, the effective or clear sieving diameter for a 203.2-mm (8.0-in.) diameter sieve frame is 190.5 mm ($7^1/_2$ in.). Sieves produced by some manufacturers do not infringe on the sieve cloth by the full 6.35 mm ($^1/_4$ in.).

[c] Sieves indicated have less than five full openings and should not be used for sieve testing.