2008 VERIFICATION OF FIELD "BOX" SIEVES ASTM E11 / AASHTO R-18

2008.1 SCOPE

Box sieves receive hard usage during the construction season which sometimes results in bent frames, enlarged openings and broken wires. The condition of all box sieves should be checked by the District Materials personnel and the sieve openings verified each year before being put into use on a construction project. The date of verification should be clearly marked on the equipment. The following procedure is intended to provide a method of verification and to provide a basis for the rejection of sieves that do not meet the required standards.

2008.2 REQUIREMENTS - GENERAL PHYSICAL CONDITION

- A. Frame must be rigid and true enough to nest with other sieves. Sieves that will not nest shall be repaired or discarded.
- B. Frame must be stenciled with proper sieve size.
- C. The mesh insert must be fastened securely to the frame.
- D. Screens must be cleaned.
- E. The mesh must be free of oblivious defects, deformations and loose wires. If any of these conditions apply, reject the sieve.

2008.3 REPAIRABLE SIEVES

Box sieves that have replaceable inserts are serviceable using the following procedure:

Replace failing mesh with a verified insert. See Section 2008.6 New Sieve Verification Procedure. When the mesh openings are 12.5mm (1/2") or smaller, place a 3 to 6mm (1/8 to 1/4") bead of silicone cement on the inside lip of the frame, press the insert firmly into it, and place another bead over the edges of insert. Press the inside retainers down firmly, and bolt inplace. Allow to cure 24 hours.

2008.4 MEASURING OPENINGS

- A. Caliper Sieves No. 4 (4.75mm) and larger will be measured with a caliper readable to 0.01mm or a verified taper drop gage.
- B. Select and measure a minimum of 5 openings including any openings that appear distorted or unusual in size. The openings should not be in the same row, if possible.
- C. Measure each of the openings as the distance between parallel wires measured at the center of each opening.
- D. Measure the 5 openings in vertical and horizontal directions and record separately. (See example, Section 2008.5.)
- E. Average the horizontal and vertical directions separately (see example, Section 2008.5) and check for compliance with Coarse Sieve Requirements Table ASTM E 11 Column 4 (Permissible Variation of Average Opening). Refer to Section 2008.8 for table. If the result does not fall within the permissible variation, refer to New Sieve Procedure, Section 2008.6.
- F. If any of the measurements exceeds the opening dimension listed in Column 6 (Maximum Individual Opening) reject the sieve, or replace mesh.
- H. Wire diameters need not be measured under this procedure but will be measured under the New Sieve Procedure.
- I. Sieves that meet requirements should be marked accordingly, initialed and dated (month and year), using tape or other marking method.

NOTE 1: Refer to Section 2008.8 (Coarse Sieve Requirements Table - ASTM E 11), for dimensions and specifications for coarse sieve sizes.

2008.5 WORKSHEET EXAMPLE

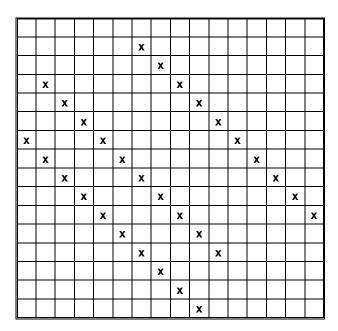
SIEVE OPENINGS GREATER THAN #4 – CALIBRATION MINNESOTA DEPARTMENT OF TRANSPORTATION OFFICE OF MATERIALS MAPLEWOOD, MINNESOTA

TEST PROCEDURE: AASHTO M92

Date: 4/1/16			Si	Sieve ID: <u>25.0mm (1") sieve</u>				
Inspe	ctor: <u>lvan</u>			Lo	ocation: _	_District Con	structio	on
Seria	l#: <u>24</u>							
Previ	ous Calibration Date	:4 <u>/1/1</u>	5	N	ext Calibr	ation Date:	4 <u>/1/1</u>	7
Calib	ration Equipment/I.D	: <u>Calip</u>	er #123_	С	alibration	Procedure:		2008
0:								
	e Size:1							
Nomi	nal Opening:	25.00	mm					
Perm	issible Variation of A	verage (Opening: _	±0.76	<u>6</u> mm			
Maxir	mum Allowable For A	Any Oper	ning:	26.4	mm			
<u>MESI</u>	H OPENINGS							
1.	Actual Vertical Ope	ening:	<u>25.38</u>	mm	Actual H	orizontal Ope	ening: _	<u>25.18</u> _mm
2.	Actual Vertical Ope	ening:	<u>25.33</u>	mm	Actual H	orizontal Ope	ening <u>:</u>	<u>24.88</u> _mm
3.	Actual Vertical Ope	ening:	<u>24.95</u>	mm	Actual H	orizontal Ope	ening: _	<u>25.57</u> mm
4.	Actual Vertical Ope	ening:	<u>25.13</u>	mm	Actual H	orizontal Ope	ening:_	<u>25.80</u> _mm
5.	Actual Vertical Ope	ening:	25.48	mm	Actual H	orizontal Ope	ening:_	<u>25.09</u> mm
Avera	age Vertical Opening	:	<u>25.25</u>	mm	า			
Avera	age Horizontal Openi	ing:	<u>25.30</u>	mm				
Large	est Actual Opening: _		25.80	mm				
Visua	ıl Check:	PAS	S { X}	FAIL { }				
Speci	ification Check:	PAS	S { X}	FAIL { }				
Action	n recommended: Re	epair Re	eplace N	one Othe	er:			

2008.6 NEW SIEVE CALIBRATION PROCEDURE

- A. Use a caliper readable to 0.01 mm or a verified taper drop gage.
- B. For sieves with 30 or less openings measure all full openings. For sieves with over 30 openings, measure a minimum of 30 full openings.
- C. Measurements will be taken in a diagonal direction across the sieve, (see below) Select openings in a diagonal line and measure 10 openings per diagonal line. Choose 3 different areas of the sieve so that the three diagonal lines so not overlap, if possible.



- 1. Measure each of the openings as the distance between parallel wires measured at the center of each opening.
- 2. Measure the openings in vertical and horizontal directions and record separately.
- 3. Measure the horizontal and vertical wire diameters and record separately.
- 4. Average the horizontal and vertical directions separately (see example, Section 2008.5) and check for compliance with Coarse Sieve Requirements Table ASTM E 11 Column 4 (Permissible Variation of Average Opening). Refer to Section 2008.8 for table. If the result does not fall within the permissible variation, reject the sieve.
- 5. If any of the measurements exceeds the opening dimension listed in Column 6, (Maximum Individual Opening) reject the sieve.

CALIBRATION REPORT I.D.2(a) SIEVES WITH OPENINGS OF #4 OR GREATER NEW SIEVE TEST PROCEDURE – E 11

MINNESOTA DEPARTMENT OF TRANSPORTATION OFFICE OF MATERIALS MAPLEWOOD, MINNESOTA 55109

Inspected by	Date		
Test Procedure: I.D.2 & E11	Sieve Size:		
Identifying No:	Location:		
Calibration Equipment: Starrett Caliper S	/N 97120114		
Previous Inspection Date:	Next Due Date:		_
Nominal Opening: <u>mm</u> Wi	re Diameter Range	mm <i>to</i>	_ mm
Variation of Average Opening	mm to	mm	
Maximum Allowable for any opening	mm		

MEASURED OPENINGS								
	Vertical Openings			Vert Wire Diam	Horizontal Openings			Horizontal Wire Diam
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
Avg.	rg.							

Largest Measured Openii	ng:	mm		
Visual Inspection: Meets	Requirements:	(Yes)	(No)	
Opening Measurements:	Meets Requirer	ments:	(Yes)	_ (No)
Visual Check:	PASS { X}	FAIL { }		
Specification Check:	PASS { X}	FAIL { }		
Action recommended: R	anain Danlaga	Nama Othan		

COARSE SIEVE REQUIREMENTS - ASTM E11-16

NOTE: All values are in millimeters

ASTM Column 2	ASTM Column 1	ASTM Column 4	ASTM Column 5	ASTM Column 6	ASTM Column 14	ASTM Column 15
Sieve Size	Nominal Opening (mm)	Permissible Variation of Average of Openings (mm)	Maximum Variation for Opening (mm)	Maximum Allowable Individual Opening (mm)	Wire Diameter Min (mm)	Wire Diameter Max (mm)
3 in.	75	73.00 – 77.00	2.78	77.78	5.4	7.2
2-1/2 in.	63	61.31 – 64.69	2.44	65.44	4.8	6.4
2 in.	50	48.66 – 51.34	2.06	52.06	4.3	5.8
1-1/2 in.	37.5	36.49 – 38.51	1.67	39.17	3.8	5.2
1-1/4 in.	31.5	30.55 – 32.45	1.47	32.97	3.4	4.6
1 in.	25.0	24.32 – 25.68	1.24	26.24	3.0	4.1
3/4 in.	19.0	18.48 – 19.52	1.01	20.01	2.7	3.5
5/8 in.	16.0	15.56 – 16.44	0.89	16.89	2.7	3.6
1/2 in.	12.5	12.15 - 12.85	0.75	13.25	2.1	2.9
3/8 in.	9.5	9.24– 9.76	0.61	10.11	1.9	2.6
1/4 in.	6.3	6.12 – 6.48	0.46	6.76	1.5	2.1
#4	4.75	4.62 – 4.88	0.37	5.12	1.3	1.9