

COMMITTEE ON MATERIALS AND PAVEMENTS

Meeting (<i>Annual or Mid-Year</i>)	Annual – Baltimore, MD
Date	Monday, August 5, 2019
Scheduled Time	3:45 p.m. – 4:45 p.m.
Technical Subcommittee & Name	4f - Metals
Chair Name and (State)	Merrill Zwanka (SC)
Vice Chair Name and (State)	Steven Ingram (AL)
Research Liaison Name and (State)	N/A

I. Introduction and Housekeeping

II. Call to Order and Opening Remarks

A. Brief Summary of Activities

- Address the recent Technical Subcommittee ballot results and other items that have come up since the January 2019 mid-year meeting. Need to move the standards balloted on the Technical Subcommittee ballot to the full COMP ballot scheduled for October 2019. TS4f covers 37 AASHTO Standards.

III. Roll Call of Voting Members

Present	Member Name	State	Present	Member Name	State
<input type="checkbox"/>	Merrill Zwanka (Chair)	SC	<input type="checkbox"/>	Darin Tedford	NV
<input type="checkbox"/>	Steven Ingram (Vice-Chair)	AL	<input type="checkbox"/>	Donald Streeter (Retired)	NY
<input type="checkbox"/>	Michael San Angelo	AK	<input type="checkbox"/>	Kenny Seward	OK
<input type="checkbox"/>	Robert Lauzon	CT	<input type="checkbox"/>	Becca Lane	Ontario
<input type="checkbox"/>	Tim McCullough	FL	<input type="checkbox"/>	Timothy Ramirez	PA
<input type="checkbox"/>	Peter Wu	GA	<input type="checkbox"/>	Danny Lane	TN
<input type="checkbox"/>	Brian Pfeifer	IL	<input type="checkbox"/>	Mladen Gagulic	VT
<input type="checkbox"/>	Richard Barezinsky	KS	<input type="checkbox"/>	John Schuler	VA
<input type="checkbox"/>	Joseph Stilwell	ME	<input type="checkbox"/>		
<input type="checkbox"/>	Brett Troutman	MO	<input type="checkbox"/>		

Annual Meeting: Simple majority of voting members (☐y/ ☐n) | Mid-Year Meeting: Voting members present (☐y/ ☐n)

A. Review of Membership (*New members, exiting members, etc.*)

IV. Approval of Technical Subcommittee Minutes

A. Mid-year Meeting (Webinar) held Tuesday, January 22, 2019 ([Attachment 1](#))

V. Old Business

A. Items from previous meeting

1. Corrected extra tables included in M31 editorially
2. Steel manhole risers – new standard needed ? A state would need to take the lead to develop a draft provisional standard if so desired.

B. COMP Ballot Items (*October 2018 COMP Ballot*)

COMP Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action
15	M31	Passed	Addressed during Mid-year call	Published June 2019
16	M54	Passed	Addressed during Mid-year call	Published June 2019
17	M102	Passed	Addressed during Mid-year call	Published June 2019
18	M103	Passed	Addressed during Mid-year call	Published June 2019
19	M111	Passed	Addressed during Mid-year call	Published June 2019
20	M163	Passed	Addressed during Mid-year call	Published June 2019
21	M202	Passed	Addressed during Mid-year call	Published June 2019
22	M204	Passed	Addressed during Mid-year call	Published June 2019
23	M227	Passed	Addressed during Mid-year call	Published June 2019
24	M232	Passed	Addressed during Mid-year call	Published June 2019
25	M255	Passed	Addressed during Mid-year call	Published June 2019
26	M275	Passed	Addressed during Mid-year call	Published June 2019
27	M285	Passed	Addressed during Mid-year call	Published June 2019
28	M292	Passed	Addressed during Mid-year call	Published June 2019
29	M270	Passed	Addressed during Mid-year call	Published June 2019
30	T65	Passed	Addressed during Mid-year call	Published June 2019
31	T243	Passed	Addressed during Mid-year call	Published June 2019

C. Technical Subcommittee Ballots (*Ballot Closed May 7, 2019*)

TS Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action
1	M163 – Castings, Iron-Chromium-Nickel, Corrosion Resistant, for General Application	Affirmative	PA – (1) The ASTM A743, Table 2 is in portrait layout, not landscape layout as is current M163, Table 2. The ASTM A743, Table 2 was in portrait mode layout prior to the latest ASTM Table 2 reformatting. Is the ballot vote indicating that the M163, Table 2 layout will be reformatted from a landscape layout table to a portrait layout table?	Approved Editorial - Since the table will have one less column it may be formatted to portrait or left as landscape, as the TS desires.
			PA – (2) Ok with combining Grade and Type columns.	
			PA – (3) Ok with rearranging the order of some of the chemicals.	
			PA – (4) Ok with notes regarding ellipses and regarding that all values are maximum except where a range is provided (good additions).	
			PA – (5) Ok with ASTM A743, Table 2 reformatting to add maximum Cu content on grades CK35MN and HG10MNN as this agrees with current M163, Table 2 for these two grades.	
2	M169 – Steel Bars, Carbon and Alloy, Cold-Finished	Affirmative	No comments	Approved
3	M203 – Steel Strand, Low-Relaxation Uncoated Seven-Wire for Concrete	Affirmative	PA – In Section 3.1.1, suggest revising completely to read “ lay length – the axial distance required for a helically placed outer wire to make one complete revolution of a strand. ” Suggestion is more descriptive than current proposed description. Obviously this	Approved, but PA has suggested re-wording This would be a change from the proposed ballot item with the wording: “ lay length – the axial

C. Technical Subcommittee Ballots (*Ballot Closed May 7, 2019*)

TS Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action
	Reinforcement		will differ from ASTM A416/A416M-18, Section 3.1.1. Perhaps ASTM can then make their standard equivalent to AASHTO's standard (i.e., leap frog to continually improve both standards).	distance required to make one complete revolution of any outer wire of strand. Since this changes the intent of the ballot item (make standard equivalent to ASTM) even though it is editorial it should be voted on if changes are desired by the TS.
4	M270 – Structural Steel for Bridges	Affirmative	No comments	Approved
5	M275 – High-Strength Steel Bars for Prestressed Concrete	Affirmative	No comments.	Approved
6	M292 – Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both	Affirmative	PA – The ASTM A194, Table 1, shows vertical column gridlines. Is the ballot indicating that as part of the AASHTO M292, Table 2 reformatting that column gridlines will be added? I believe the vertical column gridlines are visually helpful.	Approved Editorial - This can be recommended to AASHTO pubs.
7	M336 – Steel Wire and Welded Wire, Plain and Deformed for Concrete Reinforcement	Affirmative	No comments	Approved
8	T244 – Mechanical Testing of Steel Products	Affirmative	PA - In Section 14.3, 4 th line, revise from “ASTM E8/E8M-15a, Fig. 25,” to “ASTM E8/E8M, Fig. 25,” (i.e., delete -15a). The reason is that AASHTO T244, Section 2.2, does not make a reference to a particular year/version of ASTM E8/E8M and, as a result, the most current version of ASTM E8/E8M is assumed. Another reason is that the current version of ASTM E8/E8M is not -15a, it is -16a.	Approved Editorial, can be addressed by Chair

(Move to COMP ballot?)

D. Reconfirmation Ballots (*October 2018 COMP Ballot*)

Reconf. Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action
1	M169	Passed	Addressed during Mid-year call	Published June 2019
2	M254	Passed	Addressed during Mid-year call	Published June 2019
3	M277	Passed	Addressed during Mid-year call	Published June 2019

4	M306	Passed	Addressed during Mid-year call	Published June 2019
5	M322	Passed	Addressed during Mid-year call	Published June 2019
6	M329	Passed	Addressed during Mid-year call	Published June 2019
7	T213	Passed	Addressed during Mid-year call	Published June 2019
8	T285	Passed	Addressed during Mid-year call	Published June 2019

E. Task Force Reports

Task Force #	Title	Members	Status/Update
N/A			

VI. New Business

- A. AASHTO re:source/CCRL/NTPEP (*Observations from assessments, as applicable.*)
 - a. NTPEP audits scheduled this year – Rebar (36), WWR (27), 7-Wire Strand (20), SS (1), M336/A1064 (8). Dropping M322 Axle/Rail Steel from audits, draft new standard.
- B. Presentation by Industry/Academia
- C. Revisions/Work on Standards for Coming Year (**Attachment 2**)
- D. Review of Stewardship List
- E. Proposed New Standards (**Attachment 3**)
 - 1. Draft TP XXX – Mass (Weight) and Diameter for Carbon-Steel for Steel Wire and Welded Wire Reinforcement for Concrete
 - a. Requested through NTPEP Reinforcing Steel and Wire Technical Committee
 - b. Variations in the way these tests have been performed – NTPEP audits
 - c. No precision or bias statement available since there was no procedure
- F. NCHRP Issues
- G. Correspondence, Calls, Meetings
 - a. Correspondence with George Miljus of Nucor Steel Birmingham concerning M31, A615 and A706 harmonization. Proposed changes to A615 and A706 (adding Grade 80 and Grade 100 Type D). (**Attachment 4**)
- H. Proposed New Task Forces (*Include list of volunteers to lead and/or join TF.*)
- I. New TS Ballots
 - 1.

VII. Open Discussion

- A.
- B.

VIII. Adjourn

TS Meeting Summary

Meeting Summary		
Items Approved by the TS for Ballot <i>(Include reconfirmations.)</i>		
Standard Designation	Summary of Changes Proposed	Ballot Type
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
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		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
New Task Forces Formed		
Task Force Name	Summary of Task	TF Member Names and (States)
Research Proposals <i>(Include number/title/states interested.)</i>		
Other Action Items		

COMMITTEE ON MATERIALS & PAVEMENTS

2018 - 2019 Mid-Year Meeting (*Webinar*) - **MINUTES**

Tuesday January 22, 2019

11:30 AM – 1:00 PM EST

TECHNICAL SUBCOMMITTEE 4f

Metals

- I. **Introduction and Housekeeping** (*AASHTO Liaison*)
- II. **Call to Order and Opening Remarks** – Merrill Zwanka (SC) Chair, Steven Ingram (AL) Vice Chair
 - A. Brief summary of activities – TS 4f covers 37 AASHTO standards. In the Fall 2018 COMP Rolling Ballot 2, this TS had 16 COMP ballot items, 1 concurrent ballot item, and 8 reconfirmation ballot items for a total of 25 ballot items. Attachment 1. Of these 25 items, there was only one negative but there were a number of comments with affirmative votes to be discussed. All editorial comments have been addressed by the chair and will not be discussed during this meeting. Several of the reconfirmation ballot standards will need additional review in 2019.
- III. **Roll Call** – Attachment 2

SC (Zwanka & Short), AL (Ingram), CT (Lauzon), IL (Pfeifer), KS (Barezinsky), MO (Trautman), NV (Tedford), NY (Streeter & Heiser), TN (Lane), Jeff De Vries (IA), Keith Hoffman (CA), Jim Welter (OH), GA, Dennis Dvorak (FHWA), Brian Johnson (AASHTO), Ryan Fragapane (AASHTO), Dean Krouse
- IV. **Approval of Technical Subcommittee Minutes** - Attachment 3

Motion: NY
Second: MO
Discussion: none – minutes passed with no discussion
- V. **Old Business**
 - A. COMP Ballot Items (Including any ASTM Changes/equivalencies) – Attachment 4
 1. Outstanding items from Annual Meeting? - See Correspondence in New Business
 2. Item No. 15 – M31 – had gone through some edits and another error was found. The grades in table 1 were harmonized to match A 615 but there were additional errors that referenced the eliminated materials. NY's comment was intended to be editorial and the group agrees. There would be another TS ballot to update additional technical changes.
 3. Item No. 16 – M54 – Negative from MI: There may be reluctance to extend softened language in AASHTO. Discussion: MO, NY, SC, CT have their own specs that gives them all access to the inspection process. AL – it doesn't appear that there are major concerns
 - a. AL motions NY seconds. Motion to find it non-persuasive passes so the standard will pass as is
 4. Item 19 – M 111 - Discussion regarding PA's comment about tolerance in sxn 6.2.3. This note is under consideration for future versions of the standards.
 5. Item 20 - M 163 - clarification for notes in the table was requested. Is the note saying the Cu content is for the purchaser or the manufacturer? Will keep as-is for now.
 6. Item 24 – M232 – There was an editorial oversight in harmonizing with ASTM in referencing B 690 rather than B 960 (numbers transposed). This was found to be editorial and will be changed.
 - a. No additional editorial comments will be adopted into this round of changes. It was suggested sxn 5.6 include "...from the galvanizer"
 7. Item 28 – M 292 – grade 4 was removed from the table but it kind of looks like it was added back in (the strike-through aligned perfectly with the 4). Verified that it was indeed removed.

- 8. Item 29 – M 270 – removing fine austenitic grain size. Dean Krouse – the incorrect version of A 709 was referenced. Should be ASTM A 709-17e¹
- B. TS Ballots - **None**
- C. Reconfirmation Ballots
 - 1. M169, M254, M277, M306, M322, M329, T213, T285
 - 2. All passed with all affirmatives.
 - 3. Comment on M306 from South Carolina – **Attachment 5**
 - 1. Comment is for future revisions to this standard
- D. Task Force Reports - **None**

VI. New Business

- A. Research Proposals - **none**
- B. AASHTO Re:source/CCRL - Observations from Assessments?
 - 1. Brian Johnson (re:source) – reported that one particular lab did not have a tensile machine with high enough capacity to test #8 rebar
 - 2. Re:source is working on a new way to show listing of accredited services for metals. If anyone ever uses the accreditation directory and has suggestions or ideas for how to improve the listing, please contact bjohnson@ashtoresource.org
- C. NCHRP Issues - **none**
- D. NTPEP REBAR/WWR Audit Program Update
 - 1. Applications for 2019 audit year are in and being scheduled. Program is growing. 26 WWR; 36 rebar; 1 stainless steel; 7-wire strand mfg program is new in 2019 and there are 8 facilities signed up.
- E. Correspondence, calls, meetings
 - 1. Proposed M105 modifications for A575 grade rings – **Attachment 6**
 - 2. Discussion about M 105 and changes. The chair is looking for a steward of this standard to help incorporate steel risers into the standard. NY volunteers to be the standard steward for M 105.
- F. Presentation by Industry/Academia - **none**
- G. Revisions/Work on Standards for Coming Year – **Attachment 7**
 - 1. The Chair put out a call for stewards to help review the content of the standards and take responsibility.
 - 2. Please reach out to the chair if you're interested in being a steward. There will be TS ballots coming out
- H. Proposed New Standards **none**
 - 1. Permission forms for drawings/photos
- I. Proposed New Task Forces **none**
- J. New TS Ballots?
 - 1. **There will be some coming out soon**
- K. Technical Subcommittee membership
 - 1. If you would like to be a member or a friend please let Merrill know and you can be added
 - 2. Please get in touch with Merrill if you would like to be a steward of the standard. If you know of someone in your DOT who is a technical expert please consider getting them involved.

VII. Open Discussion

none

VIII. Adjourn

- A. AL; 2nd KS adjourn 12:33 p.m.

TS <4f> 2018 Annual Meeting Summary		
Meeting Date:	8/6/2018	
Items approved by the TS for Committee and or Technical Subcommittee Ballot:		
Standard Designation	Page Numbers/Section Titles for Proposed Changes in Minutes	Technical Subcommittee and/or Committee?
M31	page 4 - Removed Grades 280 and 520 for Type W. These were included by error.	COMP
M54	page 2 - ASTM equivalency.	COMP
M102	page 2 - ASTM equivalency.	COMP
M103	page 1 - ASTM equivalency - TS voted to keep the reference to T244 in this standard.	COMP
M111	page 2 - ASTM equivalency. Sections 6.2, 6.2.1 and a figure were left off of the TS ballot and are included here for a concurrent ballot.	Concurrent
M163	page 1 - ASTM equivalency - TS voted to keep the reference to T244 in this standard.	COMP
M202	page 1 - ASTM equivalency.	COMP
M204	page 1 - ASTM equivalency.	COMP
M227	page 2 - ASTM equivalency.	COMP
M232	page 2 - ASTM equivalency.	COMP
M255	page 1 - ASTM equivalency.	COMP
M275	page 2 - ASTM equivalency.	COMP
M285	page 1 - ASTM equivalency.	COMP
M292	page 2 - ASTM equivalency. More work will be done on this standard in 2019.	COMP
M270	page 2 - Harmonization with ASTM A709.	COMP
T65	page 1 - ASTM equivalency.	COMP
T243	page 1 - ASTM equivalency.	COMP
New Task Forces Formed:		
Task Force Name	Summary of Task	Names of TF Members
Other Action Items:		
M31: editorial fix - remove the Grade 280 and 520 Type W columns in Table 3.		
M103 and M163: editorial fix - put T244 reference back in standards.		
M163 editorial fix - remove B after '70B, 485B, 30B, 205B' for CF8 Chromium, 9 Nickle		
M292: editorial - check table references before COMP ballot		
Contact manufacturer from e-mail in coorespondance to have them bring something forward to the TS regarding A36 material approval for Manhole/Catch/Basin/Inlet/Valve Box Riser.		

Technical Subcommittee 4f - Metals - January 2019 Membership

Prefix	FirstName	Initials	LastName	Company	Designation	MemberType
Mr.	Merrill	E	Zwanka	South Carolina Department of Transportation	Chair	Voting
Mr.	Steven		Ingram	Alabama Department of Transportation	Vice Chair	Voting
Mr.	Michael		San Angelo	Alaska Department of Transportation and Public Facilities	Member	Voting
Mr.	Robert	G	Lauzon	Connecticut Department of Transportation	Member	Voting
Mr.	Steve	M	Duke	Florida Department of Transportation	Member	Voting
Mr.	Peter		Wu	Georgia Department of Transportation	Member	Voting
Mr.	Brian		Pfeifer	Illinois Department of Transportation	Member	Voting
Mr.	Richard	A	Barezinsky	Kansas Department of Transportation	Member	Voting
Mr.	Rick	L	Bradbury	Maine Department of Transportation	Member	Voting
Mr.	Brett	Steven	Trautman	Missouri Department of Transportation	Member	Voting
Mr.	Darin	P	Tedford	Nevada Department of Transportation	Member	Voting
Mr.	Donald		Streeter	New York State Department of Transportation	Member	Voting
Mr.	Kenny	R.	Seward	Oklahoma Department of Transportation	Member	Voting
Ms.	Becca		Lane	Ontario Ministry Of Transportation	Associate Member	Voting
Mr.	Timothy		Ramirez	Pennsylvania Department of Transportation	Member	Voting
Mr.	Danny	L.	Lane	Tennessee Department of Transportation	Member	Voting
Mr.	Mladen		Gagulic	Vermont Agency of Transportation	Member	Voting
Mr.	Scott		George	Alabama Department of Transportation	Member	Non-Voting
Mr.	Keith	D	Hoffman	California Department of Transportation	Member	Non-Voting
Mr.	Jonathan	T	Boardman	Connecticut Department of Transportation	Member	Non-Voting
Mrs.	Anne		Holt	Ontario Ministry Of Transportation	Associate Member	Non-Voting
Ms.	Hannah		Schell	Ontario Ministry Of Transportation	Associate Member	Non-Voting
Mr.	Dean	C	Krouse	Krouse Consulting	Friend	Non-Voting
Mr.	Greg		Halsted	Concrete Reinforcing Steel Institute	Friend	Non-Voting
Mr.	Jim		Schoen	Nucor-Yamato	Friend	Non-Voting
Mr.	Martin		Gagne	International Zinc Association	Friend	Non-Voting
Mr.	Tore	Olav	Arnesen	Vector Corrosion Technologies, Inc.	Friend	Non-Voting
Ms.	Maria		Knake	AASHTO Re:source	Member	Non-Voting
Mr.	Steven		Lenker	AASHTO Re:source	Member	Non-Voting
Mr.	Gregory	V	Uherek	AASHTO Re:source	Member	Non-Voting
Mr.	Dennis	V	Dvorak	Federal Highway Administration	Ex Officio	Non-Voting
Ms.	Katheryn		Malusky	AASHTO	Liaison	Non-Voting
Mr.	Ryan		Fragapane	AASHTO	Liaison	Non-Voting
Ms.	Casey		Soneira	AASHTO	AASHTO Staff	None
Ms.	Georgene	M	Geary	GGfGA Engineering, LLC	AASHTO Staff	Non-Voting
Mr.	Henry		Lacinak	AASHTO	AASHTO Staff	None

COMMITTEE ON MATERIALS & PAVEMENTS

2018 Annual Meeting – Cincinnati, OH

Monday August 6, 2018

3:45 – 4:45 PM EST

TECHNICAL SUBCOMMITTEE 4f

Metals

- I. **Call to Order and Opening Remarks** – **Merrill Zwanka (SC) chair, Steven Ingram (AL) vice chair**
- II. **Roll Call**
- III. **Approval of Technical Subcommittee Minutes**
 1. Mid-year web meeting held January 22, 2018. **Motion OK, Second MO. Approved**
- IV. **Old Business**
 - A. COMP 2017 Ballot Items – **For information**
 - i. 2017 confirmation ballot items completed – M 105, M 204, M 255, M 314
 - ii. 2017 COMP ballot items completed – M 203, T 244, M 32, M 55, M 221, M 225, MP 30 (M 336), M 31
 - B. TS 2018 Ballots
 - i. TS4f Ballot 1 – March 2018
 1. M 103 - All affirmative votes. **Comment from VA. T244 is being removed. A strength test needs to be referenced.**
 - a. **Motion to put T244 back in. Motion VA, Second OK. Passed.**
 2. M 163 - All affirmative votes. **Comments from VA and GA.**
 - a. **VA - Same T244 comment from VA. Motion to put T244 back in. Motion VA, Second OK, Passed.**
 - b. **Editorial comment to remove b after CF8 Chromium, 9 Nickel: 70B, 485B, 30B, 205B. Moved to make this editorial revision.**
 3. M 202 - All affirmative votes. Comment from VA.
 4. M 204 - All affirmative votes. Comment from VA.
 5. M 255 - All affirmative votes. No comments.
 6. M 285 - All affirmative votes. Comment from VA.
 7. T 65 - All affirmative votes. No comments.
 8. T 243 - All affirmative votes. Comment from VA.

Comments were same moving through Items 3-8. One overall motion was made to move all eight items to COMP ballot (with T244 added back to M103 and M163). **Motion VA, second IL. Passed.**

ii. TS4f Ballot 2 – May 2018

1. M 54 - All affirmative votes. Comments from PA, MO – **both editorial and changes were made.**
2. M 102 - All affirmative votes. Comments from VA, **PA (discuss)**, AL, SC, MO and OK – **editorial and changes made.**
 - a. **PA comment that tables in section 7 don't match ASTM standard. Merrill will mark as editorial and move forward. Comment on paragraph renumbering is being disregarded since it then won't match ASTM.**
3. M 111 - All affirmative votes. Comments from **PA (discuss)**, SC, MO, and KS – **editorial and changes made.**
 - a. **6.2, 6.2.1, and a figure were left out during ballot. Motion to resolve and move to concurrent ballot: motion OK. second MD, passed**
4. M 227 - All affirmative votes. No comments.
5. M 232 - All affirmative votes. Comments from CA, **PA (discuss)**, and MO – **editorial and changes made.**
6. M 275 - All affirmative votes. Comments from CA, **PA (discuss)**, AL, MO, and KS – editorial and changes made.
 - a. **Suggested revisions being skipped to keep match with ASTM.**
7. M 292 revisions - All affirmative votes. Comments from **VA (discuss)**, **PA (discuss)**, SC, and MO – **editorial and changes made.**
 - a. **VA – table references throughout standard seemed off. Merrill said he thinks it was just from track changes. They match ASTM as is, so will be left. Will verify the tables prior to the COMP ballot.**
 - b. **PA – 8.3.1 ISO 4033 reference is missing. Merrill - Will leave alone for now and look at further for next ballot.**

Motion to move these 7 (other than M111) to COMP ballot: Motion AL, Second VA, Passed.

iii. TS4f Ballot 3 – June 2018

1. M 270 update to harmonize with ASTM A709
 - a. 13 affirmative votes, 2 negative votes and 3 no votes.
 - b. CA – no vote but had comments, **comments addressed**
 - c. PA – affirmative with comments, **comments addressed**
 - d. VA – negative vote, **change made and withdrawn negative**
 - e. GA – negative vote, **comments addressed and withdrawn negative**

- f. Comments were reviewed by Marty Francis of Arcelormittal and changes proposed.

Motion to move M270 to COMP ballot: motion PA, second AL, passed

C. Task Force Reports

- i. A new task force for coated bars was proposed at the mid-year meeting. Chair asked the committee for someone to step-up and lead this TF. There were no volunteers so this TF proposal will not advance.

V. New Business

A. Research Proposals - **None**

- 1. Quick turnaround RPS
- 2. Full NCHRP RPS

B. AASHTO Technical Service Programs Items – **Report from Ryan Fragapane**

i. **NTPEP**

- 1. 37 rebar facilities, 27 welded wire, only one issue has come up – the welded wire shear requires a moving rig, but since the fixed rig is a more rigorous test it's been accepted by NTPEP recently. The committee has decided this is not the case any more. 5 or 6 manufacturers will all be notified of the change.
- 2. Wire only plants – 2 currently, a 3rd hasn't paid.
- 3. Stainless steel – 1 manufacturer signed up this year. Expect other 2 in 2019
- 4. 7-wire auditing is set to start in 2019.

C. NCHRP Issues - **None**

D. Correspondence, calls, meetings

- i. Attachment 9 – Ron Stanevich: e-mail from manufacturer requesting A36 material approval for Manhole/Catch/Basin/Inlet/Valve Box Riser. Merrill suggests contacting the manufacturer to have them bring something to the Technical Subcommittee to work with.

E. Presentation by Industry/Academia - **None**

F. Proposed New Standards - **None**

G. Proposed New Task Forces - **None**

H. Standards Requiring Reconfirmation

- i. M 111 – Currently under revision
- ii. M 169 – **Reconfirm**
- iii. M 232 – Currently under revision
- iv. M 254 – **Reconfirm (but needs updating)**
- v. M 270 – Currently under revision
- vi. M 277 – **Reconfirm**
- vii. M 285 – Currently under revision
- viii. M 292 – Currently under revision
- ix. M 306 – **Reconfirm**

- x. M 322 – **Reconfirm (but needs updating)**
- xi. M 329 – **Reconfirm (but needs updating)**
- xii. T 213 – **Reconfirm**
- xiii. T 285 – **Reconfirm**

No motion required and the standards requiring reconfirmation will be pushed through.

I. COMP Ballot Items (including any ASTM changes/equivalencies/harmonization)

VI. Open Discussion

- A. Merrill: M31, Table 3 – 2 columns (Grades 280 and 520 for Type W) were left in that were supposed to be removed to be equivalent to ASTM for grading types. Proposing to make changes editorially. **Chair called for a voice vote for a motion to move to COMP ballot instead of concurrent: VA Motion, OK Second, Passed.**

VII. Adjourn: **Motion MD, Second PA, Passed.** 4:40 p.m.

Agency	Individual Name	Item No. 15 - COMP ballot for M 31. Removed Grades 280 and 520 for Type W. These were included by error. See page 4.		
New York State Department of Transportation	Donald Streeter	Affirmative	Under Markings, subsection 20.3.3: The last sentence states that "Grade 40 Type W bars shall be marked with a W". But M31 now proposes to remove Grade 40, Type W under Table 3. Please correct. Under Markings, subsection 20.3.3: The first sentence is confusing. Appears to insinuate that S and W are for grade 60 bars only. Yet Table 3 indicates S and W for various grades. This revised M31 keeps Grade 75 rebar. The new ASTM A615 (2018) eliminated grade 75 in favor of Grade 80. Just an observation.	Discuss. Suggest adding Grades 75 and 80 to the sentence to clarify the intent. However... Do we wish to delete Grade 75 to match A615?
Pennsylvania Department of Transportation	Timothy L Ramirez	Affirmative	Affirmative with possible technical comment: 1) In Section 20.3.3, 5th line, delete the text "Grade 40 Type W bars shall be marked with a W" to match proposed deletions in Tables 3 and 4. There may be other text that needs revised in this section to match the proposed deletions in Tables 3 and 4.	Agree with the comment. This was an oversight during the revision.

20.3.3 *Type of Steel*—The letter *S* or *W* indicates that the bar was produced to this specification or for Grade 420 [60], Grade 520 [75], or Grade 550 [80] bars only; the letter *S* indicates that the bar was produced to meet M 31M/M 31 Type S and ASTM A615; the letter *W* indicates that the bar was produced to meet M 31M/M 31 Type W and ASTM A706/A706M. A Type W bar will also meet the requirements for Type S bars of the same Grade. Grade 40 Type W bars shall be marked with a W; Grade 40 Type S bars have no markings.

For reference:

Table 1—Tensile Requirements, SI Units

	Type S Grade 280 [40] ^a	Type S Grade 420 [60]	Type S Grade 520 [75]	Type S Grade 550 [80]
Tensile strength, min MPa [psi]	420 [60,000]	620 [90,000]	690 [100,000]	725 [105,000]
Yield strength, min, MPa [psi]	280 [40,000]	420 [60,000]	520 [75,000]	550 [80,000]
Elongation in 200 mm, min %				
Bar Designation No.				
10 [3]	11	9	7	7
13, 16 [4, 5]	12	9	7	7
19 [6]	12	9	7	7
22, 25 [7, 8]	—	8	7	7
29, 32, 36 [9, 10, 11]	—	7	6	6
43, 57 [14, 18]	—	7	6	6
		Type W Grade 420 [60]		Type W Grade 550 [80]
Tensile strength, min MPa [psi]		550 [80,000] ^b		690 [100,000] ^b
Yield strength, min, MPa [psi]		420 [60,000]		550 [80,000]
Yield strength, max, MPa [psi]		540 [78,000]		675 [98,000]
Elongation in 200 mm, min %				

Bar Designation No.		
10 [3]	14	12
13, 16 [4, 5]	14	12
19 [6]	14	12
22, 25 [7, 8]	12	12
29, 32, 36 [9, 10, 11]	12	12
43, 57 [14, 18]	10	10

^a Grade 280 bars are furnished only in sizes 10 through 19. [Grade 40 bars are furnished only in sizes 3 through 6.]

^b Tensile strength shall not be less than 1.25 times the actual yield strength.

Agency	Individual Name	Item No. 16 - COMP ballot for M 54 - ASTM Equivalency. See page 2.		
Michigan Department of Transportation	John F Staton	Negative	There should be discussions regarding the ASTM rationale for deleting language in section 10 regarding the purchasers right for access to the production of materials that they are purchasing. This deletion may be favorable to the ASTM community. However, there may be reluctance to soften the language to this extend throughout the AASHTO community.	Discuss
New York State Department of Transportation	Donald Streeter	Affirmative	Under "Reference Documents", in blue font, low alloy is misspelled as "low allow".	Will fix editorially.
Pennsylvania Department of Transportation	Joseph S Robinson	Affirmative	Section 2.1 (Editorial) Revise to read "...and Low Alloy.." not "Allow".	Will fix editorially.

10. INSPECTION AND TEST REPORTS

- 10.1. *Inspection*—The inspector representing the purchaser shall have free entry, at all times, while work on the contract of the purchaser is being performed, to all parts of the manufacturer's plant that concern the fabrication of the mats ordered. The manufacturer shall afford the inspector all reasonable facilities to satisfy that the mats are being furnished in accordance with this specification. All tests and inspection shall be made at the place of fabrication prior to shipment, unless otherwise specified and shall be so conducted as not to interfere unnecessarily with fabricating operations. Inspection of the welded steel bar mats as to general workmanship shall be visual agreed upon between the purchaser and the manufacturer as part of the purchase order or contract.

Agency	Individual Name	Item No. 19 - Concurrent ballot for M 111. ASTM equivalency. Sections 6.2, 6.2.1 and a figure were left off of the TS ballot and are included here for a concurrent ballot. See page 2.		
Kansas Department of Transportation	Richard A Barezinsky	Affirmative	2.2 Add ASTM D6386 and ASTM D7803 since they are referenced in 6.2.	Agree. Will fix editorially.
New York State Department of Transportation	Donald Streeter	Affirmative	First sentence in 6.2.2 has been inadvertently (I believe) changed from allowing only one half of one percent of the galvanized area to be repaired to half of the total galvanized area to be repaired by striking out "1 percent of" from the sentence. I believe this to be a typo, or erroneous edit. I don't think they intended to delete the "1 percent of" from the sentence.	Agree. Will fix editorially.
Pennsylvania Department of Transportation	Timothy L Ramirez	Affirmative	Affirmative with editorial comment: 1) Footnote or endnote 1 at the very end of this standard may no longer need to be included in this standard. This footnote is typically added when a standard is published, but contains editorial revisions that have not been balloted but are being added with the new publishing of the standard. In this proposed revision case, all revisions are being balloted (both editorial and technical). The one exception is if the chair makes editorial changes to address any comments received through this COMP ballot.	Agree. Will fix editorially.
Pennsylvania Department of Transportation	Joseph S Robinson	Affirmative	6.2.3 Comment - the min/max range of repair is only 1 mil tolerance (3 mils min to 4 mils max). This range will be difficult to achieve by painting as well as difficult to measure (accuracy). Suggest at least a 2-3 mil range for practicality	Discuss. This wording matches A123.
Texas Department of Transportation	Miles Ralph Garrison	Affirmative	See attached editorial comment to Table 1 of M 111.	Download Attachment(s) This was a typo. Will fix the table editorially.

6.2.3. The minimum thickness of renovation in the uncoated areas for repairs using zinc metallizing or zinc solder shall be that the class required by the thickness grade for the appropriate steel material category and thickness range in Table 1 in accordance with the requirements of Section 6.1.5, except that for renovation using zinc paints, the thickness of renovation shall be 50 percent higher than that required by Table 1, but not greater than The minimum thickness of the renovation in the uncoated areas using paints containing zinc dust shall be 75 µm [3.0 mils] and the maximum thickness of the renovation using paints containing zinc dust shall be 100 µm [4.0 mils].

Agency	Individual Name	Item No. 20 - COMP ballot for M 163. ASTM equivalency - TS voted to keep the reference to T244 in this standard. See page 1.		
Pennsylvania Department of Transportation	Joseph S Robinson	Affirmative	Page 13 - Comment B/Table 2 - Is reference optional for the purchaser or manufacturer?	Discuss.

GRADE (UNS)	Type	Composition, %													
		Carbon max	Manganese max	Silicon max	Phosphorus max	Sulfur max	Chromium	Nickel	Molybdenum	Columbium	Selenium	Copper	Tungsten max	Vanadium max	Nitrogen
CB30 (J91803)	20 Chromium	0.30	1.00	1.50	0.04	0.04	18.0–21.0	2.00 max	---	---	---	B	---	---	---

(A) Grade CF8C shall have a columbium content of not less than eight times the carbon content and not more than 1.0%. If a columbium-plus-tantalum alloy in the approximate Cb:Ta ratio of 3:1 is used for stabilizing this grade, the total columbium-plus-tantalum content shall not be less than nine times the carbon content and shall not exceed 1.1%.

(B) For Grade CB30 a copper content of 0.90 to 1.20% is optional.

(C) Grade HG10MNN shall have a columbium content of not less than eight times the carbon, but not over 1.00 %.

Agency	Individual Name	Item No. 24 - COMP ballot for M 232 - ASTM equivalency. See page 2.		
Kansas Department of Transportation	Richard A Barezinsky	Affirmative	2.2 the ASTM standard listed here do not match those in A153. If the intent is harmonization then they should match. Missing are B960 and F2329. Added, but not in A153 is B690. Note 7: duplicate "a"	Discuss. This appears to be an oversight dating back to 2010. Checked with Martin Gagne to verify. B690 is not related to galvanizing. Editorial?
Missouri Department of Transportation	Brett Steven Trautman	Affirmative	Affirmative vote with editorial comment: 1) In Section 5.7, the first line, need to superscript the number '2'. 2) In Note 7, the third line, need to remove the extra 'a' so it reads: "...is not detected during a sample inspection."	Will fix editorially.
Pennsylvania Department of Transportation	Joseph S Robinson	Affirmative	'New' section 5.6 - Comment - Suggest adding after "...cause for rejection..." the statement "...from the galvanizer."	Discuss.

2.2.

ASTM Standards:

- A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
 - A780/A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 - A902, Standard Terminology Relating to Metallic Coated Steel Products
 - B6, Standard Specification for Zinc
 - B487, Standard Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
 - B690, Standard Specification for Iron-Nickel-Chromium-Molybdenum Alloys (UNS N08366 and UNS N08367) Seamless Pipe and Tube
-
- E376, Standard Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Testing Methods
 - F1470, Standard Practice for Fastener Sampling for Specified Mechanical Properties and Performance Inspection
 - F1789, Standard Terminology for F16 Mechanical Fasteners

ASTM B960, Specification for Prime Western Grade-Recycled (PWG-R) Zinc.

5.6. If the galvanized material covered by this specification is bent or otherwise fabricated to a degree that causes the zinc coatings to stretch or compress beyond the limit of elasticity, any cracking or flaking of the coating resulting from bending or fabricating shall not be cause for rejection.

5.6. 5.7 High strength bolts, typically over 1040 MPa [150,000 lb/in.2] ultimate tensile strength, may be subject to hydrogen embrittlement. Practices to safeguard against hydrogen embrittlement are described in ASTM A143/A143M.

Agency	Individual Name	Item No. 26 - COMP ballot for M 275 - ASTM equivalency. See page 2.		
Kansas Department of Transportation	Richard A Barezinsky	Affirmative	Since ASTM E30 was withdrawn, why is it still in this spec?	This was an oversight. Will fix editorially.
Missouri Department of Transportation	Brett Steven Trautman	Affirmative	Affirmative vote with editorial comments: 1) In Section 3.1.2, the information is being edited out of the specification but the section number still remains. If removing information then need to renumber the subsequent sections.2) Section 3.2.2 refers to Section 14 that is being edited out of the specification. Please note that the section numbers have not been edited out.3) Section 3.2.3 references Section 16. Believe it should reference Section 17.4) Section 3.2.4 references Section 17. Believe it should reference Section 18.5) In Section 6.5, the information is shown in italics. Need to show the information not in italic's to be consistent with the rest of the specification.6) In Section 14, the information is being edited out of the specification but the section numbers still remain. If removing information then need to renumber the subsequent sections.	Will carefully check the section numbering and references when preparing the final document for publications.

Agency	Individual Name	Item No. 28 - COMP ballot for M 292 - ASTM equivalency. More work will be done on this standard in 2019. See page 2.		
Pennsylvania Department of Transportation	Joseph S Robinson	Affirmative	Comment - Why deletion of "Grade 4" specification from multiple text areas but Grade was ADDED to Table 7?	It looks like Grade 4 was indeed deleted from Table 7 but I will verify that it has when preparing it for publication.

Table 7—Grade Symbol Marking of Nuts

Grade and Type	Nuts Hot Forged or Cold Punched	Nuts Machined from Bar Stock	Nuts Manufactured in Accordance with Section 6.6
1	1	1B	—
2	2	2B	—
2H ^a	2H	2HB	—
2HM ^{a,b}	2HM	2HMB	—
3	3	3B	—
4	4	4B	—
4L^e	4L	4BL	—
6	6	6B	—
6F	6F	6FB	—
7	7	7B	—
7L ^c	7L	7BL	—

Agency	Individual Name	Item No. 29 - COMP ballot for M 270 - Harmonization with ASTM A709. See page 2.		
Pennsylvania Department of Transportation	Joseph S Robinson	Affirmative	Old (Deleted) Section S4 - Comment - while it is understood that the intent is for harmonization, a critical property of austenitic steels IS the unique grain size and structure. Is the deletion of this section picked up somewhere else in an associated specification?	<p>Discuss.</p> <p>Response from Marty Francis: The deletion of S4 was made solely for purposes of harmonization with ASTM A709. ASTM A709 paragraph 6.1 and now AASHTO M270 paragraph 6.1 both state "For all Grades, the steel shall be killed." I believe ASTM has been addressing the issue of "fine austenitic grain" in many standards as it has been misinterpreted. Additionally, grade 50CR is a dual phase steel (ferrite and tempered martensite) and the old S4 would not apply. I am not aware of any other associated standard that contains the requirement as in the old S4.</p> <p>Also – some additional information from Dean Krouse: ASTM A709-18 was just published and includes four new structural shape grades taken from A913; these grades are now available domestically.</p>

S4. FINE AUSTENITIC GRAIN SIZE

S4.1. The steel shall be killed and have a fine austenitic grain size.

Comment [FMA5]: This is NOT included in A709.

Reconfirmation Ballot Item No. 4 – M306, Standard Specification for Drainage, Sewer, Utility, and Related Castings

Passed with all affirmatives but had a comment from South Carolina:

Reconfirm but recommend the following be considered for *future revisions*:

- Section 5.2.1: Add "whichever value is smaller"
- Sections 8.1.2 and 8.1.3: Add spaces within paragraphs to separate different points.

5.2.	<i>Permissible Variations:</i>
5.2.1.	As-cast dimensions may vary one half the maximum shrinkage possessed by the metal or $\pm 5.21 \text{ mm/m}$ [$\pm 1/16 \text{ in./ft}$], <u>whichever value is smaller</u> .
5.2.2.	Mass [weight] ± 5 percent drawing/specification mass [weight].

8.1.2.	<i>Acceptance on the Basis of Separately Cast Test Bar</i> —Before supplying any castings to a purchaser, the manufacturer must first submit to the purchaser for acceptance documentation that a quality system is in place to ensure material compliance. Thereafter, acceptability of the castings produced in accordance with this specification shall be by certification of the results of material tests conducted on separately cast test bars, and by inspection of the finished castings for freedom from defects. The manufacturer shall provide certification that the test bars furnished for testing represent the castings furnished for the order. If there are more than three test-bar failures in one calendar year, the producing facility shall immediately report the three failing test results to the purchaser and shall discontinue supplying product. In order for the producing foundry to resume supplying product, documentation that a new quality system is in place to ensure material compliance must be submitted to and accepted by the purchaser. The purchaser shall also have the option of allowing production under Section 8.1.3.
8.1.3.	<i>Acceptance on the Basis of Cast-On Test Bars</i> —A test bar for determining the class of iron shall be cast on each member at a place where it can be easily broken off with a breakage pattern remaining on the member. Test bars are to be removed only after receipt of permission from the purchaser. Test bars shall be of sufficient size to produce a machined test specimen complying with the dimensional requirements for a Type B test bar as shown in Table 2 of M 105. For lots of 15 or fewer, 30 percent of the test bars selected at random from castings shall be tested by the supplier/manufacturer. For lots of 16 to 100, 10 percent or a minimum of 5 test bars, whichever is greater, selected at random from castings shall be tested by the supplier/manufacturer. For lots greater than 100, a minimum of 10 percent of all test bars selected at random from castings shall be tested by the supplier/manufacturer. All test bars shall conform to the strength requirements specified. If any of those test bars fail to conform to the strength requirements herein specified because of surface or internal defects, additional testing shall be performed at the direction of the purchaser. For lots of 15 or fewer, all remaining test bars must be tested. For larger lots, an additional 10 or 10 percent, whichever is greater, of the remaining test bars selected at random from the entire lot must be tested. All test results from this additional testing must conform to the

From: [Scott Fier](#)
To: [Zwanka, Merrill E](#)
Cc: [Dave Fritz - Fritz Eng. Ltd](#)
Subject: RE: AASHTO Information as related to ASTM
Date: Monday, October 15, 2018 11:56:10 AM
Attachments: [AASHTO M 105 modified for A575 grade rings.docx](#)

*** This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. ***

Merrill,

Our product is installed into a cast iron frame, and the cast iron lid is placed into our riser. We thought it logical to modify M 105 to accept our steel riser in-between the Lid and Frame. It is straight forward, a lot less complicated, and hopefully less time doing it this way. What are your thoughts, and what are the next steps from here for AASHTO approval?

Scott Fier
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www.ahp1.com



From: Zwanka, Merrill E [mailto:ZwankaME@scdot.org]
Sent: Friday, August 24, 2018 8:48 AM
To: Scott Fier <sfier@ahp1.com>
Cc: Ingram, Steven (ingrams@dot.state.al.us) <ingrams@dot.state.al.us>
Subject: RE: AASHTO Information as related to ASTM

Scott,

I looked but AASHTO M183 doesn't seem to exist anymore. I don't know the history behind M183 but I do know that sometimes when there's an existing ASTM standard that most people are already using, like A36, then sometimes AASHTO will drop a related standard due to lack of interest.

That leaves two approaches – you can approach ASTM and get A36 modified, or draft a new AASHTO standard that is clearly different from anything ASTM already has. I've included a working copy of

M105 that can be used as a starting point if you wish to draft a potential AASHTO standard.

I hope this helps.

Merrill

From: Scott Fier [<mailto:sfier@ahp1.com>]
Sent: Wednesday, August 22, 2018 11:01 AM
To: Zwanka, Merrill E
Subject: RE: AASHTO Information as related to ASTM

*** This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. ***

Hello Merrill,

I'm having a hard time reaching you on the phone, so I figured an email would be best. M103 is Steel Castings (A27). M105 is Gray Iron Castings (A48). Our product is not a casting (liquid metal poured into a mold). It is made from Hot Rolled A36 Steel. Hot rolled steel does not have the issues surrounding castings. The only ASSHTO designation for Manhole/Catch Basin Risers is currently in M103 & M105. A36 Steel has a higher yield than both M103 & M105. It only seems logical to add our product (Manhole/Catch Basin Risers) into the ASTM A36 designation, which I think is M183 from the below searching. When you have a minute please call or respond back. I have never added a product to AASHTO before, so if you can email me a template or sample of what form I need to fill out to get "Manhole/Catch Basin Risers" into AASHTO under A36 material I would be very grateful. We are already approved in many DOT's in the U.S. including SC. However having an AASHTO destination for our product would eliminate all the R.E./Inspectors call back questions about our material. It has been escalating, and this is the only solution I see to clear up the material we are using.

I will be at a conference in Kansas City next week. If you can get me moving in the right direction with AASHTO this week, I will start the paper work. I thank you for all your help, and appreciate your effort in guiding me through AASHTO.

AASHTO	ASTM	Specification Description
M-183	A36	Standard Specification for Carbon Structural Steel

A36 Mechanical Requirements

Tensile, ksi	58 - 80
Yield, min ksi	36
Elongation, min % in 2"	20

Elongation, min % in 8"

23

This abridged table shows only the mechanical requirements for bars. The complete table can be found in the ASTM standard at www.astm.org

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From: Zwanka, Merrill E [<mailto:ZwankaME@scdot.org>]
Sent: Friday, August 17, 2018 11:32 AM
To: Scott Fier <sfier@ahp1.com>
Cc: Ron Stanevich - AASHTO WVDOT <ron.l.stanevich@wv.gov>; Ingram, Steven (ingrams@dot.state.al.us) <ingrams@dot.state.al.us>; Fragapane Ryan (rfragapane@ashto.org) <rfragapane@ashto.org>
Subject: RE: AASHTO Information as related to ASTM

Mr. Fier,

Good morning. We got a copy of this information just prior to our COMP meeting in Cincinnati last week and so I brought this subject up during the Technical Subcommittee 4f, Metals, meeting. The members were not opposed to what you are suggesting so my next step was going to be to contact you.

To get something moving here we need for you to either mark up a current standard that you think needs just a little adjustment to incorporate the A36 steel, or to draft a new standard for the subcommittee's review. Since the AASHTO COMP is essentially made up of volunteers who work for state DOTs, it will be difficult to find someone to jump in and create this new or revised standard on their own. But if you can prepare something for review, and provide the rationale for the changes, then we can get the group to review it and possibly move it to subcommittee ballot if there is enough interest.

One thing we will have to watch out for is ASTM equivalencies. AASHTO M105 is a stand-alone

AASHTO standard, but M103 is equivalent to ASTM A27. If we make a significant change to M103 but ASTM doesn't change A27 then the equivalency starts to diverge and we could run into some issues. Revisions to M105 are easier to deal with.

Please let me know if you need any additional information.

Thanks,

Merrill

Chair, AASHTO COMP TS4f - Metals

Merrill E. Zwanka, P.E.
Materials and Research Engineer
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P.O. Box 191
Columbia, South Carolina 29202
(803) 737-6681
zwankaME@scdot.org



From: Scott Fier [<mailto:sfier@ahp1.com>]
Sent: Friday, August 17, 2018 11:00 AM
To: Zwanka, Merrill E
Cc: Ron Stanevich - AASHTO WVDOT
Subject: FW: AASHTO Information as related to ASTM

*** This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. ***

Mr. Zwanka,

I was given your name by Ron Stanevich yesterday. Ron thought that your "Tech Section 4h" is the correct section for our product. If you read this email from the bottom up, it will give you a little bit of the history of our product, DOT's, and use of our product.

American Highway Products Ltd. manufactures **A36 Steel** "Pivoted Turnbuckle" Manhole Risers and Catch Basin/Inlet Risers. This is our 40th year. Our product is used on DOT jobs across the U.S. AASHTO has a Manhole Riser Specification for

Cast Iron (M105) & poured Steel Castings (M103), but not for Hot Rolled A36 Steel Material. Hot Rolled A36 Material is widely approved for bridges, guard rails, inlet grates, etc., however AASHTO does not have a specification for Manhole/Catch Basin/Inlet Risers.

A Manhole or Catch Basin Riser is used to raise utility lids or grate up to grade when paving a road. I attached some case studies so you can see the application. Our product has not changed much over the years however ASTM has. Since 1978 we used the first attachment “**Riser Certification**” document to explain our product material, and how it relates to AASHTO & ASTM. This worked fine through the 80’s, 90’s and early 2000’s. We began getting calls from R.E./Inspectors questioning our material in 2010 or a little before, and it slowly increased until in 2014 when I contacted AASHTO. Evan Rothblatt (AASHTO) helped me write a document (2nd attachment) “**MH Riser Certification Wording Clarification**” in 2014. That did help, however as we grow, the number of calls from R.E./Inspectors concerning our material increases as well.

To eliminate the confusion, I would like AASHTO to modify, or add a specification for **A36 Steel** Manhole & Catch Basin/Inlet Risers. Ron said I should contact you to present my request. I look forward to hearing from you.

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From: Stanevich, Ron L [<mailto:Ron.L.Stanevich@wv.gov>]
Sent: Thursday, August 16, 2018 4:02 PM
To: Scott Fier <sfier@ahp1.com>
Subject: RE: AASHTO Information as related to ASTM

Hello Scott

Sorry I have not been shunning you, as I got your email several days ago, and I guess it got pushed down the list and I forgot about it.

Seems as though these names can be found on [AASHTO's COMP website](#), I assume it is ok for me to

pass it along.

Zwanka, Merrill E ZwankaME@scdot.org

Note I did not see Mr. Ingram's name listed, he may have moved on to something else and no longer involved. Thus I only listed Mr. Zwanka's

Again sorry for the delays, hope this helps.

Ron Stanevich, PE

[Director Materials Control, Soils & Testing Division](#)

West Virginia Division Of Highways,

190 Dry Branch Drive

Charleston, WV 25306

(wk) 304.558.9874

(fax) 304.558.0253

From: Scott Fier [<mailto:sfier@ahp1.com>]

Sent: Thursday, July 05, 2018 3:40 PM

To: 'Rothblatt Evan' <ERothblatt@aaashto.org>

Subject: RE: AASHTO Information as related to ASTM

Evan,

I contacted you in 2014 concerning our Manhole/Catch Basin-Inlet/Valve Box riser material in 2014 and you were very helpful. As our company grows (US & Canada) we are getting more and more questions on the material certifications we send with our risers to DOT Resident Engineers/Inspectors of State Projects. I wanted to contact Matt Mueller and have A36 Steel Manhole, Catch Basin/Inlet & Valve Box Risers added to utility adjusting rings if possible, if not, then hopefully have a new specification added for A36 material. When I went to the link below it expired (it's been 4 yrs.). I tried Googling Matt Mueller (IL DOT) and saw he has retired. I tried going on AASHTO <https://materials.transportation.org/> and finding that page but could not. Can you give me the updated link to the **TS4h: M103, M105, M306 ; Chair: & Vice: ?** I thank you for your help!

Scott Fier

1-888-272-2397 x-302

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From: Rothblatt Evan [<mailto:ERothblatt@ashto.org>]
Sent: Monday, October 27, 2014 3:49 PM
To: Scott Fier <sfier@ahp1.com>
Subject: RE: AASHTO Information as related to ASTM

My pleasure Scott.

Evan Rothblatt, EIT

Associate Program Manager, Materials
 Phone: 202-624-3648
 Fax: 202-624-5469
 Email: erothblatt@ashto.org



444 North Capitol Street NW
 Suite 249
 Washington, DC 20001
www.transportation.org

From: Scott Fier [<mailto:sfier@ahp1.com>]
Sent: Monday, October 27, 2014 3:32 PM
To: Rothblatt Evan
Subject: RE: AASHTO Information as related to ASTM

Evan,

Thank you for the information. I will be out of town the rest of this week, but will begin contacting the DOT's next week. Thank you for your help.

Scott Fier
 1-888-272-2397 x-302
 American Highway Products

From: Rothblatt Evan [<mailto:ERothblatt@ashto.org>]
Sent: Monday, October 27, 2014 1:04 PM
To: Scott Fier
Subject: RE: AASHTO Information as related to ASTM

Scott,

In looking over your inquiry, as you have stated you have a hot-rolled steel as opposed to a cast iron product. You mentioned that states are requesting that your product meet or exceed these cast iron

specifications though, correct? (I assume for chemical properties and tensile strength?) This too could potentially be the same reasoning for the requirement of M270.

In any event, you may wish to approach the matter directly with the state to see exactly what criteria they are looking for from the listed specs. You can also contact the chair and vice chair of the tech sections in charge of the specs you mentioned and either seek to change the existing spec(s) by proposing some new language to be added or to see about creating a new spec altogether for your product. This would then need to be brought forward to the entire tech section for review and balloting.

The AASHTO materials specifications are listed numerically and by tech section in the front of each volume; at the bottom left corner of each spec the Tech Section number is listed. You may also find the list of specifications managed by each TS on the materials page here:

<http://materials.transportation.org/Pages/Technical-Sections.aspx>

As well as find a listing and contact info of each tech section's membership here (just select the tech section from the drop down list):

<http://materials.transportation.org/Pages/Membership.aspx>

To assist I am listing out the tech section for each of the specs you mentioned, as well as the chair/vice chair:

TS4a: T280, M199 ; Chair: Bob Horwhat (PENNDOT), Vice: Reid Kaiser (NV DOT)

TS4f/g: M270 ; Chair: Merrill Zwanka (SC DOT), Vice: Lyndi Blackburn (AL DOT)

TS4h: M103, M105, M306 ; Chair: Matt Mueller (IL DOT), Vice: Woody Hood (MD DOT)

Thanks for your inquiry,

Evan Rothblatt, EIT

Associate Program Manager, Materials

Phone: 202-624-3648

Fax: 202-624-5469

Email: erothblatt@aaashto.org



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Suite 249

Washington, DC 20001

www.transportation.org

From: Scott Fier [<mailto:sfier@ahp1.com>]

Sent: Monday, October 27, 2014 10:30 AM

To: Rothblatt Evan

Subject: RE: AASHTO Information as related to ASTM

Evan,

I thank you for your assistance in determining if AASHTO has a classification for our

product. Have you made any progress in your research?

Scott Fier
 1-888-272-2397 x-302
 American Highway Products
 11723 Strasburg Bolivar Rd. NW.
 BOLIVAR, OH 44612
www.ahp1.com



From: Scott Fier [<mailto:sfier@ahp1.com>]
Sent: Wednesday, October 22, 2014 1:07 PM
To: 'Rothblatt Evan'
Subject: RE: AASHTO Information as related to ASTM

Mr. Evan,

Thank you for your quick response. Material used to manufacture our Manhole and Inlet/Catch Basin risers is hot rolled steel meeting ASTM A575-96 M1010 AND ASTM A36-12. We **do not** manufacture **cast iron** frames and lids/grates that are placed over the utilities in the street or highway. Our product is used to raise the lids/grates up to a new elevation when paving the street or highway. It acts like a washer on the weight bearing surface of the frame to lift the lid/grate to a new elevation. If you look at page 10 of our attached specification the safety factor is huge.

Our certification letter created in the early 80's states that our product meet and or exceed the standards of AASHTO Designation M103 and meet and or exceed ASTM A-27. We are getting questions now by DOT's asking about other AASHTO designations:

- 1) **ILDOT** AASHTO M105 and AASHTO M 306
- 2) **ORDOT** AASHTO M 199 (ASTM C 478) and AASHTO T 280 (ASTM C 497)
- 3) **PADOT** AASHTO M270M (M270) Grade 250 (36) [ASTM A709, Grade 250 (36)]

When I look at the headings for the designations it reads:

M103 *Standard Specification for Steel **Castings**, Carbon, for General Application.*

M105 *Standard Specification for Gray Iron **Castings**.*

M306 *Standard Specification for Drainage, Sewer, Utility, and Related **Castings**.*

M270 *Standard Specification for Structural Steel for **Bridges**.*

We do not manufacture cast iron frames and grates nor do we build steel bridges. Since AASHTO does not have a Specification for Manhole & Inlet/Catch Basin risers,

what logical category should our product fall under? Please call or email me with next step. I thank you for your help in resolving this issue. I attached a couple of Case Studies on our product so you can see the function of our product.

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From: Rothblatt Evan [<mailto:ERothblatt@ashto.org>]
Sent: Tuesday, October 21, 2014 4:43 PM
To: 'Scott Fier'
Cc: McDonnell, Jim; Smith, Greta
Subject: RE: AASHTO Information as related to ASTM

Scott,

Thank you for contacting us with your inquiry. In reviewing the AASHTO Materials specifications, it does not appear that we currently have an AASHTO specification for Manhole & Inlet/Catch Basin risers. If you could provide the current wording for your product as well as the ASTM designation you are referring it may assist me with confirming whether or not there is an equivalent spec for your products.

Thanks,

Evan Rothblatt, EIT

Associate Program Manager, Materials
 Phone: 202-624-3648
 Fax: 202-624-5469
 Email: erothblatt@ashto.org



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 Washington, DC 20001
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From: McDonnell, Jim
Sent: Tuesday, October 21, 2014 4:34 PM
To: 'Scott Fier'

Cc: Rothblatt Evan
Subject: RE: AASHTO Information as related to ASTM

Scott –

Evan Rothblatt, who is our Associate Program Manager for Materials, can provide the information you need. I have copied him on this e-mail, and he will be in touch shortly.

-- Jim

Jim McDonnell, P.E.

Program Director, Engineering
American Association of State Highway and Transportation Officials (AASHTO)
444 North Capitol Street NW, Suite 249
Washington, DC 20001

(202) 624-5448
(202) 624-5469 Fax
jimm@ashto.org

From: Scott Fier [<mailto:sfier@ahp1.com>]
Sent: Tuesday, October 21, 2014 3:39 PM
To: McDonnell, Jim
Subject: AASHTO Information as related to ASTM

Mr. McDonell,

I am an owner of a company named American Highway Products Ltd. The main product we manufacture is Manhole & Inlet/Catch Basin risers used to raise utility lids/grates to grade when paving a street or highway. This is a second generation business my Father started in 1978. Our company deals with all 50 states at a City/Municipal level to the state DOT. I have questions relating to our product and AASHTO and ASTM designations by each state. The states are different in their designation of both AASHTO and ASTM standards. Our current product certification we use is based on wording probably produced in early 80's. The product and steel we use has not changed much over the years, however AASHTO and ASTM has. Can you refer me to someone who can help me word our product material (ASTM) as related to AASHTO? I thank you for your help.

Scott Fier
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After review it appears that the product (riser adjustment ring) is made from ASTM A36 steel and the proposed change to AASHTO M105 allows ASTM A575 M1010 steel for the production of this type product.

ASTM A575 only specifies a chemical requirement. ASTM A36 specifies the Manganese content range as 0.60-0.90, ASTM A575 M1010 Table1 specifies the manganese content range as 0.25-0.60 and under certain carbon content allows the manganese limit to be increased to 0.75.

It appears that the product in question, which is made from ASTM A36 steel, will not meet the chemical requirements for Manganese in ASTM A575 M1010 Table 1.

- These riser adjustment rings are made of hot-rolled steel instead of cast iron or cast steel. As such, the argument is that the current specifications for cast iron and cast steel are not suitable for these rings.
- Representative for the producer lists the specifications for these hot-rolled steel riser adjustment rings as:
 - ASTM A575 – Grade M1010

TABLE 1 Grade Designations and Chemical Compositions of Hot-Wrought Merchant Quality M Series Carbon Steel Bars

Grade Designation	Carbon, %	Manganese, ^A %	Phosphorus, max, %	Sulfur, max, %
M1008	0.10 max	0.25–0.60	0.04	0.05
M1010	0.07–0.14	0.25–0.60	0.04	0.05
M1012	0.09–0.16	0.25–0.60	0.04	0.05
M1015	0.12–0.19	0.25–0.60	0.04	0.05
M1017	0.14–0.21	0.25–0.60	0.04	0.05
M1020	0.17–0.24	0.25–0.60	0.04	0.05
M1023	0.19–0.27	0.25–0.60	0.04	0.05
M1025	0.20–0.30	0.25–0.60	0.04	0.05
M1031	0.26–0.36	0.25–0.60	0.04	0.05
M1044	0.40–0.50	0.25–0.60	0.04	0.05

(A) Unless prohibited by the purchaser, the manganese content shall be permitted to exceed 0.60% on heat analysis to a maximum of 0.75%, provided that the carbon range on heat analysis has the minimum reduced by 0.01% for each 0.05% manganese over 0.60%.

- ASTM A36
 - Minimum Yield: 36 ksi
 - Minimum Tensile Strength: 58-80 ksi
 - Elongation in 8": 20%

TABLE 3 Chemical Requirements

NOTE 1—Where “...” appears in this table, there is no requirement. The heat analysis for manganese shall be determined and reported as described in the heat analysis section of Specification **A6/A6M**.

Product	Shapes ^A	Plates > 15-in. [380 mm] Width ^B					Bars; Plates ≤ 15-in. [380 mm] Width ^B			
Thickness, in. [mm]	All	To ¾ [20], incl	Over ¾ to 1½ [20 to 40], incl	Over 1½ to 2½ [40 to 65], incl	Over 2½ to 4 [65 to 100], incl	Over 4 [100]	To ¾ [20], incl	Over ¾ to 1½ [20 to 40], incl	Over 1½ to 4 [100], incl	Over 4 [100]
Carbon, max, %	0.26	0.25	0.25	0.26	0.27	0.29	0.26	0.27	0.28	0.29
Manganese, %	0.80–1.20	0.80–1.20	0.85–1.20	0.85–1.20	...	0.60–0.90	0.60–0.90	0.60–0.90
Phosphorus, max, %	0.04	0.030	0.030	0.030	0.030	0.030	0.04	0.04	0.04	0.04
Sulfur, max, %	0.05	0.030	0.030	0.030	0.030	0.030	0.05	0.05	0.05	0.05
Silicon, %	0.40 max	0.40 max	0.40 max	0.15–0.40	0.15–0.40	0.15–0.40	0.40 max	0.40 max	0.40 max	0.40 max
Copper, min, % when cop per steel is specified	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

^A Manganese content of 0.85–1.35 % and silicon content of 0.15–0.40 % is required for shapes with flange thickness over 3 in. [75 mm].

^B For each reduction of 0.01 percentage point below the specified carbon maximum, an increase of 0.06 percentage point manganese above the specified maximum will be permitted, up to the maximum of 1.35 %.

- Assuming that we are talking about bars over ¾", A575 steel can be made that will meet the requirements of A36. The manganese could be brought up to a max of .75%, but the carbon content range would then be .04-.11%. This would be pretty low, but might work.

- ASTM A36 is the same tensile properties and chemistry requirements as ASTM A706/AASHTO M270, Grade 36, which is the specification for bridge steel.
- Currently some DOTs require iron castings for “frames, grates, covers, etc.” to meet the requirements of AASHTO M105, Class 35B and the alternate load test conforming to the requirements of AASHTO M306.
 - AASHTO M105, Class 35B requires a tensile strength of only 35ksi and I see no chemistry requirements.
 - AASHTO M306 adds a proof load test requirement 40,000 lbs concentrated on a 9” by 9” area. I believe this spec. would apply to these rings as well.
- The main problem I see with this specification revision is that there is no strength requirement in the specification that is proposed. They make the rings to meet the ASTM A36 specification, but that doesn’t mean that the next company will do the same.

Standard Specification for Gray Iron Castings

AASHTO Designation: M 105-09 (~~2013~~2018)

Technical Section: 4f, Metals

DRAFT



American Association of State Highway and Transportation Officials
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Washington, D.C. 20001

Standard Specification for
Gray Iron Castings

AASHTO Designation: M 105-09 (~~2013~~2018)



Technical Section: 4f, Metals

1. SCOPE

- 1.1. This specification covers gray iron castings intended for general engineering use where tensile strength is a major consideration. Castings are classified on the basis of the tensile strength of the iron in cast test bars.
- 1.1.1. This specification subordinates chemical composition to tensile strength.
- 1.2. Castings produced to this specification are graded on the basis of minimum tensile strength obtained in special test ~~coupons-specimen~~ designed to standardize cooling rate. The tensile strength developed in certain casting sections may vary from test ~~coupon-specimen~~ values. (See Appendix X1.2.)
- 1.3. The values stated in SI units are to be regarded as the standard.
- 1.4. AASHTO M 306 may be specified for drainage structure castings such as frames, grates, rings, and covers for inlets, manholes, and other structures if loading requirements exceed normal highway loading or if more restrictive dimensional tolerances are required
- ~~4.4.1.5.~~ ASTM A575 M1010 may be specified for fabricated grade adjustment rings used between grey iron frames, grates, rings and covers for inlets, manholes, and other structures where forming, welding and fastening methods are not suitable for grey iron casting material.

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standard:*
 - M 306, Drainage, Sewer, Utility, and Related Castings
- 2.2. *ASTM Standards:*
 - A644, Standard Terminology Relating to Iron Castings
 - E8/E8M, Standard Test Methods for Tension Testing of Metallic Material
 - *A575, Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
- 2.3. *Military Standard:*
 - MIL-STD-129, Marking for Shipment and Storage¹
- 2.4. *Federal Standard:*
 - Fed. Std. No. 123, Marking for Shipment (Civil Agencies)¹

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3. TERMINOLOGY

- 3.1. *Definitions of Terms Specific to This Standard:*
- 3.1.1. *manufacturer*—a producing foundry/facility where iron is melted and poured into molds.
- 3.1.2. *supplier*—an agent, representative, or organization that provides castings that it did not manufacture.
- 3.1.3. *purchaser*—the end user of the casting.
- 3.2. The preceding terms and definitions are specific to this specification. ASTM A644 contains other terms and definitions relating to gray iron castings.

4. CLASSIFICATION

- 4.1. Castings ordered and produced in accordance with this specification are classified into a number of grades based on the properties of cast test bars (Table 1). Each class is designated by a number followed by a letter. The number indicates the minimum tensile strength of the cast test bar, and the letter indicates the size of the test bar. Examples of proper designations are as follows:
- Gray Iron Castings, M 105, Class 30B
 - Gray Iron Castings, M 105, Class 40C

5. ORDERING INFORMATION

- 5.1. *Orders for material to this specification shall include the following information:*
- 5.1.1. AASHTO designation number and year of issue;
- 5.1.2. Class of iron required (Section 4.1 and Table 1);
- 5.1.3. The size of the cast test bar (letter classification—A, B, C, or S) that best represents the thickness of the controlling section of the casting (Table 3);
- 5.1.4. The tension test specimen (B or C) to be machined from test bar C (Section 11.3, Table 2, and Figure 2);
- 5.1.5. The tension test specimen to be machined from test bar S (Section 11.4, Table 2, and Figure 2);
- 5.1.6. Lot size (Section 14);
- 5.1.7. Special requirements (Section 7);
- 5.1.8. Saving tested specimens or unbroken test bars (Section 16.4); and
- 5.1.9. Special preparation for delivery (Section 18).

6. TENSILE REQUIREMENTS

- 6.1. Test bars representing castings conforming to this specification shall meet the requirements for tensile strength as described in Table 1.

Table 1—Requirements for Tensile Strength of Gray Cast Irons in Cast Test Bars

Class	Tensile Strength, Min, MPa [ksi]	Nominal Test Bar, Dia, mm [in.]	Class	Tensile Strength, Min, MPa [ksi]	Nominal Test Bar, Dia, mm [in.]
No. 20A	138 [20]	22.4 [0.88]	No. 45A	310 [45]	22.4 [0.88]
No. 20B		30.5 [1.2]	No. 45B		30.5 [1.2]
No. 20C		50.8 [2.0]	No. 45C		50.8 [2.0]
No. 20S		Bar S ^a	No. 45S		Bar S ^a
No. 25A	172 [25]	22.4 [0.88]	No. 50A	345 [50]	22.4 [0.88]
No. 25B		30.5 [1.2]	No. 50B		30.5 [1.2]
No. 25C		50.8 [2.0]	No. 50C		50.8 [2.0]
No. 25S		Bar S ^a	No. 50S		Bar S ^a
No. 30A	207 [30]	22.4 [0.88]	No. 55A	379 [55]	22.4 [0.88]
No. 30B		30.5 [1.2]	No. 55B		30.5 [1.2]
No. 30C		50.8 [2.0]	No. 55C		50.8 [2.0]
No. 30S		Bar S ^a	No. 55S		Bar S ^a
No. 35A	241 [35]	22.4 [0.88]	No. 60A	414 [60]	22.4 [0.88]
No. 35B		30.5 [1.2]	No. 60B		30.5 [1.2]
No. 35C		50.8 [2.0]	No. 60C		50.8 [2.0]
No. 35S		Bar S ^a	No. 60S		Bar S ^a
No. 40A	276 [40]	22.4 [0.88]			
No. 40B		30.5 [1.2]			
No. 40C		50.8 [2.0]			
No. 40S		Bar S ^a			

^a All dimensions of test bar S shall be as agreed on between the manufacturer and the purchaser.

7. SPECIAL REQUIREMENTS

- 7.1. When agreed on in writing between the manufacturer and the purchaser, it may be necessary for the castings to meet special requirements regarding hardness, chemical composition, microstructure, pressure tightness, radiographic soundness, dimensions, surface finish, etc.

8. DIMENSIONAL REQUIREMENTS

- 8.1. The castings shall conform to the dimensions or drawings furnished by the purchaser, or, if there are no drawings, to the dimensions predicted by the pattern equipment supplied by the purchaser.

9. WORKMANSHIP AND FINISH

- 9.1. The surface of the casting shall be free of adhering sand, scale, cracks, and hot tears, as determined by visual examination.
- 9.2. No repairing by plugging or welding of any kind shall be permitted unless written permission is granted by the purchaser.

10. CAST TEST BARS

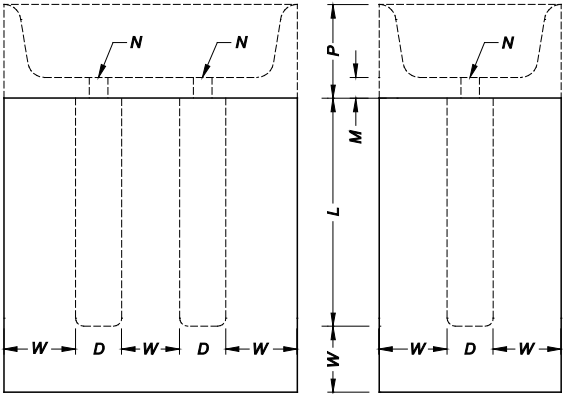
10.1. Test bars shall be poured from the same lot as the castings they represent, and shall have dimensions as shown in Table 2. Allowance may be made for reasonable pattern draft within the tolerances shown in Table 2. Test bars A, B, and C are all standard test bars in the form of simple cylinders. Test bar S is special and is intended for use where the standard bars are not satisfactory.

Table 2—Diameters and Lengths of Cast Test Bars

Test Bar	As-Cast Diameter, mm [in.]			Length, mm [in.]	
	Nominal (Mid-Length)	Min (Bottom)	Max (Top)	Min (Specified)	Max (Recommended)
A	22.4 [0.88]	21.6 [0.85]	24.4 [0.96]	125 [5.0]	150 [6.0]
B	30.5 [1.20]	29.0 [1.14]	33.5 [1.32]	150 [6.0]	230 [9.0]
C	50.8 [2.00]	48.3 [1.90]	53.3 [2.10]	175 [7.0]	255 [10.0]
S ^a					

^a All dimensions of test bar S shall be as agreed on by the manufacturer and the purchaser.

10.2. The separately cast test bars shall be cast in dried, baked, or chemically bonded molds made mainly of an aggregate of siliceous sand with appropriate binders. The average grain size of the sand shall approximate that of the sand in which the castings are poured. Molds for the test bars shall be approximately at room temperature when poured. More than one test bar may be cast in a single mold, but each bar in the mold shall be surrounded by a thickness of sand that is not less than the diameter of the bar. A suitable design for a separately cast test bar mold is shown in Figure 1.



Required Features		Optional Features	
1.	Material—Aggregate of dry siliceous sand.	1.	Number of test bars in a single mold—Two suggested.
2.	Position—Bars vertical.	2.	Design of pouring cup.
3.	L—See Table 3.	3.	P—50 mm (2 in.), suggested.
4.	D—See Table 3.	4.	N—8 mm ($\frac{5}{16}$ in.) in diameter, suggested.
5.	W—Not less than diameter, D.	5.	M = 1.5 N, suggested.

Figure 1—Suitable Design and Dimensions for Mold for Separately Cast Cylindrical Tension Test Bars for Gray Iron

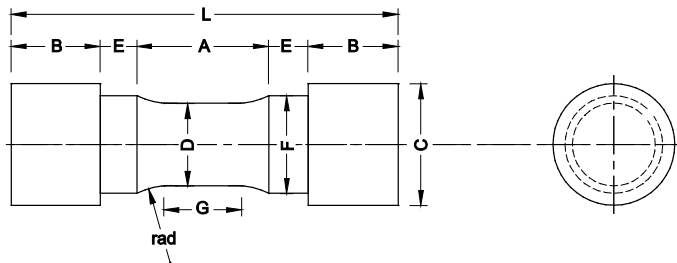
- 10.3. Test bars that are intended to represent castings that are cooled in the mold to less than 480°C (900°F), before shakeout, shall be cooled in their molds to a temperature less than 480°C (900°F). Then they may be cooled in still air to room temperature.
- 10.4. Test bars that are intended to represent castings that are hotter than 480°C (900°F) when shaken out of their molds shall be cooled as described in Section 10.3 or (by agreement between the manufacturer and the purchaser) may be shaken out of their molds at approximately the same temperature as the castings they represent.
- 10.5. When castings are stress-relieved, annealed, or otherwise heat treated, test bars shall receive the same thermal treatment and shall be treated adjacent to the castings they represent.
- Note 1**—The intent of these provisions is as follows: to prohibit the casting of test bars in molds of metal, graphite, zircon, lightweight aggregates, or other materials that would affect significantly the tensile strength of the iron; to prohibit control of tensile strength of the test bars by manipulation of the grain size of the sand; and to prohibit the casting of test bars in molds preheated substantially above room temperature.

Table 3—Cast Test Bars for Use When a Specific Correlation Has Not Been Established between the Test Bar and the Casting

Thickness of the Wall of the Controlling Section of the Casting, mm (in.)	Test Bar
Under 6 (0.25)	S
6 to 12 (0.25 to 0.50)	A
13 to 25 (0.51 to 1.00)	B
26 to 50 (1.01 to 2)	C
Over 50 (2)	S

11. TENSION TEST SPECIMENS

- 11.1. *For Test Bar A*—the tension test specimen A, as shown in Figure 2, shall be machined concentric with the axis of the test bar.



Dimensions, mm (in.)	Tension Test, Specimen A	Tension Test, Specimen B	Tension Test, Specimen C
<i>G</i> —Length of parallel, min	13 (0.50)	19 (0.75)	32 (1.25)
<i>D</i> —Diameter	12.7 ± 0.25 (0.500 ± 0.010)	19.1 ± 0.4 (0.750 ± 0.015)	31.7 ± 0.050 (1.25 ± 0.025)
<i>R</i> —Radius of fillet, min	25 (1)	25 (1)	50 (2)
<i>A</i> —Length of reduced section, min	32 (1 ¹ / ₄)	38 (1 ¹ / ₂)	57 (2 ¹ / ₄)
<i>L</i> —Overall length, min	95 (3 ³ / ₄)	100 (4)	160 (6 ³ / ₈)
<i>C</i> —Dia of end section, approx	22.2 (7/ ₈)	31.8 (1 ¹ / ₄)	47 (1 ⁷ / ₈)
<i>E</i> —Length of shoulder, min	6 (1/ ₄)	6 (1/ ₄)	8 (5/ ₁₆)
<i>F</i> —Dia of shoulder	16 ± 0.5 (5/ ₈ ± 1/ ₆₄) ^a	25 ± 0.5 (5/ ₁₆ ± 1/ ₆₄) ^a	36 ± 0.5 (1 ⁷ / ₁₆ ± 1/ ₆₄) ^a
<i>B</i> —Length of end section			

^a Optional to fit holders on testing machine. If threaded, root diameter shall not be less than dimension, *F*.

Figure 2—Tension Test Specimens

- 11.2. *For Test Bar B*—the tension test specimen B, as shown in Figure 2, shall be machined concentric with the axis of the test bar.
- 11.3. *For Test Bar C*—tension test specimens B or C, as shown in Figure 2, shall be machined concentric with the axis of the test bar. Unless the size of the tension test specimen to be machined from test bar C is specified in writing by the purchaser, the decision whether to use tension test specimen B or C shall be made by the manufacturer of the castings.
- 11.4. *For Test Bar S*—the nature and dimensions of the tension test specimen shall be determined by agreement between the manufacturer and the purchaser.

12. TENSION TEST

- 12.1. Tension test specimens shall fit the holders of the testing machine in such a way that the load shall be axial.
- 12.2. The elapsed time from the beginning of loading in the tension test to the instant of fracture shall be not less than 15 s for test specimen A and not less than 20 s for specimens B and C.

13. NUMBER OF TESTS AND RETESTS

- 13.1. The tension test shall be conducted in accordance with ASTM E8/E8M.

- 13.2. One tension test shall be performed on each lot and shall conform to the tensile requirements specified.
- 13.3. If the results of a valid test fail to conform to the requirements of this specification, two retests shall be made. If either retest fails to meet the specification requirements, the castings represented by these test specimens shall be rejected. A valid test is one wherein the specimen has been properly prepared and appears to be sound and on which the approved test procedure has been followed.
- 13.4. If sufficient cast test pieces are not available, the manufacturer shall have the option of removing a test specimen from a location of representative casting, as agreed on between the manufacturer and purchaser.
- 13.5. If the first test results indicate that a heat treatment is needed to meet the test requirements, the entire lot of castings and the representative test specimens shall be heat treated together. Testing shall proceed in accordance with Sections 13.1 through 13.4.
- 13.6. If, after testing, a test specimen shows evidence of a defect, the results of the test may be invalidated and another test made on a specimen from the same lot.

14. **SAMPLING**

- 14.1. *A lot shall consist of one of the following:*
- 14.1.1. All the metal poured from a single heating in a batch type melting furnace.
- 14.1.2. All the metal from two or more batch type melting furnaces poured into a single ladle or a single casting.
- 14.1.3. All the metal poured from a continuous melting furnace for a given period of time between changes in charge, processing conditions, or aim-for chemistry, or 4 h, whichever is the shorter period.
The purchaser may agree to extend the 4-h time period to 8 h if the manufacturer can demonstrate sufficient process control to warrant such an extension.
- 14.1.4. One ladle of iron having a mass of more than 910 kg (2000 lb).
- 14.2. When an individual casting is poured from more than one ladle of iron, or when the iron for that casting is melted in more than one melting unit or from a different melt or a different type of charge in the same melting unit, or both, the iron from each melting unit, melt, or type of charge shall be considered a different lot.
- 14.3. When more than one lot of iron is used to pour a single casting, the iron in each lot must conform to this specification.
- 14.4. When an individual casting is poured with iron melted in more than one melting unit or from more than one melt or type of charge in the same melting unit, and when the irons from the different sources are mixed together thoroughly in a ladle before the casting is poured, the mixed iron in that ladle may be considered a lot.

15. INSPECTION

- 15.1. Unless otherwise specified in the contract or purchase order, the supplier/manufacturer shall be responsible for carrying out all the tests and inspections required by this specification, using purchaser approved reliable facilities, and shall maintain complete records of all such tests and inspections. Such records shall be available for review by the purchaser.
- Two separate and alternative bases of acceptance are permitted. If the producing foundry is located within the United States of America, and operates in accordance with an acceptable Quality System approved by the purchaser, all castings must adhere to the inspection criteria listed in Section 15.1.1. If the producing foundry is not located within the United States of America, or if the producing foundry is located within the United States of America and it is not operating in accordance with an acceptable Quality System approved by the purchaser, all castings must adhere to the inspection criteria listed in Section 15.1.2.
- 15.1.1. *Acceptance on the Basis of Separately Cast Test Bars*—Before supplying any castings to a purchaser, the manufacturer must first submit to the purchaser for acceptance documentation that a Quality System is in place to ensure material compliance. Thereafter, acceptability of the castings produced in accordance with this specification shall be by certification of the results of material tests conducted on separately cast test bars, and by inspection of the finished castings for freedom from defects. The manufacturer shall provide certification that the test bars furnished for the testing represent the castings furnished for the order. If there are more than three test bar failures in one calendar year, the producing facility shall immediately report the three failing test results to the purchaser and shall discontinue supplying product. In order for the producing foundry to resume supplying product, documentation that a new Quality System is in place to ensure material compliance must be submitted to and accepted by the purchaser. The purchaser shall also have the option of allowing production under Section 15.1.2.
- 15.1.2. *Acceptance on the Basis of Cast-On Test Bars*—A test bar for determining the class of iron shall be cast on each member at a place where it can be easily broken off with a breakage pattern remaining on the member. Test bars are only to be removed after receipt of permission from the purchaser. Test bars shall be of sufficient size to produce a machined test specimen complying with the dimensional requirements for a Type B test bar as shown in Table 2. For lots of 15 or fewer, 30 percent of the test bars selected at random from castings shall be tested by the supplier/manufacturer. For lots of 16 to 100, 10 percent or a minimum of 5 test bars, whichever is greater, selected at random from castings shall be tested by the supplier/manufacturer. For lots greater than 100, a minimum of 10 percent of all test bars selected at random from castings shall be tested by the supplier/manufacturer. All test bars shall conform to the strength requirements specified. If any of those test bars fails to conform to the strength requirements herein specified because of surface or internal defects, additional testing shall be performed at the direction of the purchaser. For lots of 15 or fewer, all remaining test bars must be tested. For larger lots, an additional 10 or 10 percent, whichever is greater, of the remaining test bars selected at random from the entire lot must be tested. All test results from this additional testing must conform to the strength requirements of this specification for the lot of castings to be acceptable. Each casting that has a test bar removed from it and evaluated must be inspected for mass (weight) and dimensions by the supplier/manufacturer. If the casting does not conform to the mass (weight) and dimensional requirements, the casting will be rejected. If a casting fails to conform to the mass (weight) or dimensional requirements, all remaining castings shall be inspected and all must conform to the requirements for the lot of castings to be acceptable.
- 15.1.2.1. If the purchaser elects to select a casting for verification of test results, the member shall be furnished by the supplier/manufacturer at no cost to the purchaser. All test specimen preparation and testing shall be paid for by the supplier/manufacturer.

16. CERTIFICATION

- 16.1. When specified by the purchaser's order or contract, a manufacturer's certification or compliance statement that the casting or lot of castings was made, sampled, tested, and inspected in accordance with this specification, including a report of test results signed by an authorized agent of the manufacturer, shall be furnished at the time of shipment, and such certification or compliance statement shall be the basis for acceptance of the casting or lot of castings.
- 16.2. A signature is not required on the certification or test report. However, the document shall clearly identify the organization submitting the certification and the authorized agent of the manufacturer who certified the test results. Notwithstanding the absence of a signature, the organization submitting the certification is responsible for its content.
- 16.3. When castings are produced at one manufacturer and labeled with the name of another organization or manufacturer, the original certifications shall be from the foundry that produced the casting. The certification shall clearly identify the manufacturer, the physical location of the facility that produced the casting, and the organization the castings were produced for. The document shall clearly identify the authorized agent for the manufacturer and the authorized agent of the organization the castings were produced for. Any testing conducted by the supplier shall be certified by the supplier and provided to the purchaser.
- 16.4. All test results as required by this specification shall be maintained by the manufacturer for seven years and shall be made available to the purchaser on request. All unbroken test bars shall be stored and maintained by the manufacturer or supplier for a minimum of three years and shall be made available to the purchaser on request.
- 16.5. Records of casting certifications issued by the manufacturer shall be maintained by the manufacturer for seven years and shall be made available to the purchaser on request.

17. PRODUCT MARKING

- 17.1. When the size of the casting permits, each individual casting shall be identified by the following: name of the manufacturer, country of manufacture, AASHTO or ASTM designation, class by number followed by a letter indicating the minimum tensile strength and size of test bar, heat identification and cast date (MM/DD/YY), casting lettering as required by the purchaser, and the markings as required to meet federal requirements.
- 17.2. If iron for the casting is melted and poured at one foundry and labeled with the name of another organization, manufacturer, or foundry, the casting shall include the name of the producing foundry and the organization the casting is produced for. The name of the producing foundry shall be cast onto the casting with lettering of equal size and in close proximity to the name of the organization the casting is produced for. This lettering shall be cast so that the producing foundry and the organization the casting is produced for can be easily identified from the same side of the casting. The casting shall also include all markings listed in Section 17.1.

18. PREPARATION FOR DELIVERY

- 18.1. Unless otherwise stated in the contract or order, the cleaning, preservation, and packing of castings for shipment shall be in accordance with the manufacturer's commercial practice. Packaging and marking shall also be adequate to identify the contents and to ensure acceptance and safe delivery by the carrier for the mode of transportation employed.

- 18.2. *U.S. Government Procurement*—When specified in the contract or purchase order, marking for shipment shall be in accordance with the requirements of Fed. Std. No. 123 for civil agencies and MIL-STD-129 for military activities.

19. KEYWORDS

- 19.1. Gray iron castings.

APPENDIX

(Nonmandatory Information)

X1. MECHANICAL PROPERTIES OF CASTINGS

- X1.1. The mechanical properties of iron castings are influenced by the cooling rate during and after solidification, by chemical composition (particularly carbon equivalent), by the design of the casting, by the design and nature of the mold, by the location and effectiveness of gates and risers, and by certain other factors.
- X1.2. The cooling rate in the mold and, hence, the properties developed in any particular section are influenced by the presence of cores; chills and chaplets; changes in section thickness; and the existence of bosses, projections, and intersections, such as junctions of ribs and bosses. Because of the complexity of the interactions of these factors, no precise quantitative relationship can be stated between the properties of the iron in various locations of the same casting or between the properties of a casting and those of a test specimen cast from the same iron. When such a relationship is important and must be known for a specification application, it may be determined by appropriate experimentation.
- X1.3. Gray iron castings in Classes 20, 25, 30, and 35 are characterized by excellent machinability, high damping capacity, low modulus of elasticity, and comparative ease of manufacture.
- X1.3.1. Castings in Classes 40, 45, 50, 55, and 60 are usually more difficult to machine, have lower damping capacity, a higher modulus of elasticity, and are more difficult to manufacture.
- X1.4. When reliable information is unavailable on the relationship between properties in a casting and those in a separately cast test specimen, and where experimentation would be unfeasible, the size of the test casting should be selected so as to approximate the thickness of the main or controlling section of the casting.
- X1.5. If iron castings are welded (Section 9.2), the microstructure of the iron is usually altered, particularly in the vicinity of the weldment. Therefore, the properties of the casting may be adversely affected by welding. Where practical, appropriate postweld heat treatment may reduce this effect of welding.

¹ Available from Standardization Documents Order Desk, Bldg. 4 Section D, Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

AASHTO COMP Metals (4f) - January 2019 Status

AASHTO	ASTM (Equiv.)	Current ASTM	Description	Status of standard	Yr to Ballot	TS Ballot	TS Ballot outcome	COMP Ballot	COMP Ballot outcome	Cat.
M 31M / M 31-19	A615 / A615M-16	A615 / A615M-18e1	Deformed and Plain Carbon and Low-Alloy Steel Bars for Concrete Reinforcement	Review A615 and A706 in 2019	2019	Aug 2018 voice vote	Passed	2018	Passed	B
M 54M / M 54-19	A184 / A184M-17	A184 / A184M-17	Welded Deformed Steel Bar Mats for Concrete Reinforcement	2018 COMP ballot for equivalency	2023	TS4f_18-02	Passed	2018	Passed	B
M 102M / M 102-19	A668 / A668M-17	A668 / A668M-17	Steel Forgings, Carbon and Alloy, For General Industrial Use	2018 COMP ballot for equivalency	2023	TS4f_18-02	Passed	2018	Passed	B
M 103 M / M 103-19	A27/A27M-17	A27/A27M-17	Steel Castings, Carbon, for General Application	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
M 105-09 (2018)	----	----	Gray Iron Castings	No action necessary.	2022					A
M 111M / M 111-19	A123/A123M-17	A123/A123M-17	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products	2018 COMP ballot for equivalency	2022	TS4f_18-02	Passed	2018	Passed	B
M 163 M / M 163-19	A743/A743M-17	A743/A743M-17	Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
M169-15 (2019)	A108-13	A108-18	Steel Bars, Carbon, and Alloy, Cold Finished	Reconfirm in Fall 2018. Review needed.	2019			2018	Passed	B
M 202M / M 202-19	A328 / A328M-13a(2018)	A328/A328M-13a(2018)	Steel Sheet Piling	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
M 203M / M 203-18	A416 / A416M-17	A416 / A416M-18	Steel Strand, Low Relaxation, Uncoated Seven-Wire for Concrete Reinforcement	Review Needed	2019					B
M 204M / M 204-19	A421 / A421M-15	A421 / A421M-15	Stress-Relieved Steel Wire for Prestressed Concrete	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
M 227M / M 227-19	A663 / A663M-17	A663 / A663M-17	Steel Bars, Carbon, Merchant Quality, Mechanical Properties	2018 COMP ballot for equivalency	2023	TS4f_18-02	Passed	2018	Passed	B
M 232 M / M 232-19	A153/A153M-16a	A153/A153M-16a	Zinc Coating (Hot Dip) on Iron and Steel Hardware	2018 COMP ballot for equivalency	2023	TS4f_18-02	Passed	2018	Passed	B
M 254-06 (2019)	-----	-----	Corrosion-Resistant Coated Dowel Bars	2016 TS ballot item - CRSI revisions. Sent back to CRSI after TS ballot. CRSI comments need addressing. Reconfirm Fall 2018 and work on for 2019	2019			2018	Passed	A
M 255M / M 255-19	A675 / A675M-14	A675 / A675M-14	Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
M 270M / M 270-19	A709 / A709M-17	A709 / A709M-18	Structural Steel for Bridges	2016 TS ballot item to sunset this standard. Passed. Comments from Dean Krouse and Norm McDonald (Iowa). 2016 COMP ballot to sunset this standard - did not pass. ASTM version is on hold too. Needs ASTM equivalency review. 2018 - Marty Francis worked on update. TS ballot summer 2018. COMP 2018.	2019	TS4f_18-03	Resolved Negatives - Passed	2018	Passed	B
M 275M / M 275-19	A722 / A722M-15	A722 / A722M-18	High-Strength Steel Bars for Prestressing Concrete	2018 COMP ballot for equivalency. Review needed.	2019	TS4f_18-02	Passed	2018	Passed	B
M 277-06 (2019)	-----	-----	Wire Rope and Sockets for Movable Bridges	Reconfirm in Fall 2018	2023			2018	Passed	A
M 285 M / M 285-19	A744/A744M-13	A744/A744M-13	Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
M 292M / M 292-19	A194 / A194M-17a	A194 / A194M-18	Carbon Steel, Alloy Steel and Stainless Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both	2018 COMP ballot for equivalency - ** for 2019 see TS 4f 2018 ballot 2 for notes about adding ISO and other non-editorial items to M292	2019	TS4f_18-02	Passed	2018	Passed	B
M 306-10 (2019)	----	----	Drainage, Sewer, Utility, and Related Castings	Reconfirm in Fall 2018	2023			2018	Passed	A
M 314-90 (2018)	-----	-----	Steel Anchor Bolts	No action necessary.	2022					A
M 322M / M 322-10 (2019)	A996 / A996M-09	A996 / A996M-16	Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement	Need to address CRSI comments and ASTM equivalency review. Reconfirm Fall 2018 and work on for 2019	2019			2018	Passed	B
M 329M / M 329-11 (2019)	-----	-----	Stainless Clad Deformed and Plain Round Steel Bars for Concrete Reinforcement	Need to address CRSI comments. Reconfirm Fall 2018 and work on for 2019.	2019			2018	Passed	A

M 334M / M334-17	-----	-----	Uncoated, Corrosion-Resistant, Deformed and Plain Chromium Alloyed, Billet-Steel Bars for Concrete Reinforcement and Dowels	Formerly MP 18M / MP 18-15. Passed 2016 COMP ballot and was published in 2017.	2021					A
M 336M / M 336-18	A1064/A1064M-15	A1064/A1064M-18a	Steel Wire and Welded Wire, Plain and Deformed, for Concrete Reinforcement	Was MP30. Passed 2017 fall ballot for full standard. Needs addl equivalency review.	2019					B
T 65 M / T 65-19	A90/A90M-13 (2018)	A90/A90M-13 (2018)	Mass (Weight) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
T 213 M / T 213-11 (2019)	A428/A428M-10 (2014)	A428/A428M-10 (2014)	Mass (Weight) of Coating on Aluminum-Coated Iron or Steel Articles	Reconfirm in Fall 2018	2023			2018	Passed	B
T 243M / T 243-19	A673 / A673M-17	A673 / A673M-17	Sampling Procedure for Impact Testing of Structural Steel	2018 COMP ballot for equivalency	2023	TS4f_18-01	Passed	2018	Passed	B
T 244-18	A370-17a	A370-17a	Mechanical Testing of Steel Products	Revised to add weld pull test as appendix and an ASTM equivalency review. Passed 2017 COMP ballot.	2022					B
T 253 -02 (2019)	-----	-----	Coated Dowel Bars	2016 TS ballot item. Sent to CRSI to address comments from the ballot. Unresolved. Needs review.	2019					A
T 285-89 (2019)	-----	-----	Bend Test for Bars for Concrete Reinforcement	Reconfirm in Fall 2018	2023			2018	Passed	A
T 372M / T372-17	----	----	Sensitivity of Stainless Steel to Intergranular Attack	Formerly T MP18a.1. Published in 2017.	2021					A
T 373M / T 373-17	----	----	Comparative Qualitative Corrosion Characterization of Steel Bars Used for Concrete Reinforcement (Linear Polarization Resistance and Potentiodynamic Polarization Tests)	Formerly T MP18a.2. Published in 2017.	2021					A
T 374M / T 374-17	----	----	Comparative Qualitative Corrosion Characterization of Uncoated Chromium-Alloyed Steel Bars Used in Concrete Reinforcement (Tombstone Test)	Formerly T MP18a.3. Published in 2017.	2021					A
T 375M / T 375-17	----	----	Identification of Iron-Based Alloy Steel Bars for Concrete Reinforcement or Dowels by Handheld X-Ray Fluorescence (XRF) Spectrometer	Formerly T MP18b.1. Published in 2017.	2021					A
T 376M / T 376-17	----	----	Macrocell Slab Chloride Threshold	Formerly T MP18a.4. Published in 2017.	2021					A
M-32M / M-32-09 (2013)	A82 / A82M-07	A82 / A82M-07	Steel Wire, Plain, for Concrete Reinforcement	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset	B
M-55M / M-55-09 (2013)	A185 / A185M-07	A185 / A185M-07	Steel Welded Wire Reinforcement, Plain, for Concrete	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset	B
M-221M / M-221-09 (2013)	A497 / A497M-07	A497 / A497M-07	Steel Welded Wire Reinforcement, Deformed, for Concrete	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset	B
M-225M / M-225-09 (2013)	A496 / A496M-07	A496 / A496M-07	Steel Wire, Deformed, for Concrete Reinforcement	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset	B

AASHTO COMP Metals (4f) - August 2019 Status									
AASHTO	ASTM (Equiv.)	Current ASTM	Description	Status of standard	Yr to Ballot	TS Ballot	TS Ballot outcome	COMP Ballot	COMP Ballot outcome
M 31M / M 31-19	A615 / A615M-16	A615 / A615M-18e1	Deformed and Plain Carbon and Low-Alloy Steel Bars for Concrete Reinforcement	Harmonizing with A615 and A706 during 2019 and 2020. Needs review.	2023				
M 54M / M 54-19	A184 / A184M-17	A184 / A184M-17	Welded Deformed Steel Bar Mats for Concrete Reinforcement	2018 COMP ballot for equivalency	2023				
M 102M / M 102-19	A668 / A668M-17	A668 / A668M-19	Steel Forgings, Carbon and Alloy, For General Industrial Use	Needs review	2023				
M 103 M / M 103-19	A27/A27M-17	A27/A27M-17	Steel Castings, Carbon, for General Application	2018 COMP ballot for equivalency	2023				
M 105-09 (2018)	----	----	Gray Iron Castings	No action necessary.	2022				
M 111M / M 111-19	A123/A123M-17	A123/A123M-17	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products	2018 COMP ballot for equivalency	2023				
M 163 M / M 163-19	A743/A743M-17	A743/A743M-19	Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application	2018 COMP ballot for equivalency. 2019 TS ballot for equivalency	2023	2019	Passed		
M169-15 (2019)	A108-13	A108-18	Steel Bars, Carbon, and Alloy, Cold Finished	Reconfirmed in Fall 2018. 2019 TS ballot for equivalency.	2023	2019	Passed		
M 202M / M 202-19	A328 / A328M-13a	A328/A328M-13a	Steel Sheet Piling	2018 COMP ballot for equivalency	2023				
M 203M / M 203-18	A416 / A416M-17	A416 / A416M-18	Steel Strand, Low Relaxation, Uncoated Seven-Wire for Concrete Reinforcement	2019 TS ballot - revised Sections 3,4,7,8,11,13	2022	2019	Passed		
M 204M / M 204-19	A421 / A421M-15	A421 / A421M-15	Stress-Relieved Steel Wire for Prestressed Concrete	2018 COMP ballot for equivalency	2023				
M 227M / M 227-19	A663 / A663M-17	A663 / A663M-17	Steel Bars, Carbon, Merchant Quality, Mechanical Properties	2018 COMP ballot for equivalency	2023				
M 232 M / M 232-19	A153/A153M-16a	A153/A153M-16a	Zinc Coating (Hot Dip) on Iron and Steel Hardware	2018 COMP ballot for equivalency	2023				
M 254-06 (2019)	-----	-----	Corrosion-Resistant Coated Dowel Bars	Needs review.	2023				
M 255M / M 255-19	A675 / A675M-14	A675 / A675M-14	Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties	2018 COMP ballot for equivalency	2023				
M 270M / M 270-19	A709 / A709M-17	A709 / A709M-18	Structural Steel for Bridges	2019 TS ballot for equivalency	2023	2019	Passed		
M 275M / M 275-19	A722 / A722M-15	A722 / A722M-18	High-Strength Steel Bars for Prestressing Concrete	2019 TS ballot for equivalency	2023	2019	Passed		
M 277-06 (2019)	-----	-----	Wire Rope and Sockets for Movable Bridges	Reconfirmed in Fall 2018	2023				
M 285 M / M 285-19	A744/A744M-13	A744/A744M-13	Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service	2018 COMP ballot for equivalency	2023				
M 292M / M 292-19	A194 / A194M-17a	A194 / A194M-18	Carbon Steel, Alloy Steel and Stainless Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both	2019 TS ballot for equivalency	2023	2019	Passed		
M 306-10 (2019)	----	----	Drainage, Sewer, Utility, and Related Castings	Reconfirmed in Fall 2018	2023				
M 314-90 (2018)	-----	-----	Steel Anchor Bolts	No action necessary.	2022				
M 322M / M 322-10 (2019)	A996 / A996M-09	A996 / A996M-16	Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement	Needs review	2023				
M 329M / M 329-11 (2019)	-----	-----	Stainless Clad Deformed and Plain Round Steel Bars for Concrete Reinforcement	Needs review	2023				
M 334M / M334-17	-----	-----	Uncoated, Corrosion-Resistant, Deformed and Plain Chromium Alloyed, Billet-Steel Bars for Concrete Reinforcement and Dowels	Formerly MP 18M / MP 18-15. Passed 2016 COMP ballot and was published in 2017.	2021				

M 336M / M 336-18	A1064/A1064M-15	A1064/A1064M-18a	Steel Wire and Welded Wire, Plain and Deformed, for Concrete Reinforcement	2019 TS ballot to revise Sections 6, 10, 13	2022	2019	Passed		
T 65 M / T 65-19	A90/A90M-13 (2018)	A90/A90M-13 (2018)	Mass (Weight) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings	2018 COMP ballot for equivalency	2023				
T 213 M / T 213-11 (2019)	A428/A428M-10 (2019)	A428/A428M-10 (2019)	Mass (Weight) of Coating on Aluminum-Coated Iron or Steel Articles	Reconfirmed in Fall 2018	2023				
T 243M / T 243-19	A673 / A673M-17	A673 / A673M-17	Sampling Procedure for Impact Testing of Structural Steel	2018 COMP ballot for equivalency	2023				
T 244-18	A370-17a	A370-18	Mechanical Testing of Steel Products	2019 TS ballot to revise to match A370-18.	2022	2019	Passed		
T 253-02 (2016)	----	----	Coated Dowel Bars	Needs review	2020				
T 285-89 (2019)	----	----	Bend Test for Bars for Concrete Reinforcement	Reconfirmed in Fall 2018	2023				
T 372M / T372-17	----	----	Sensitivity of Stainless Steel to Intergranular Attack	Formerly T MP18a.1. Published in 2017.	2021				
T 373M / T 373-17	----	----	Comparative Qualitative Corrosion Characterization of Steel Bars Used for Concrete Reinforcement (Linear Polarization Resistance and Potentiodynamic Polarization Tests)	Formerly T MP18a.2. Published in 2017.	2021				
T 374M / T 374-17	----	----	Comparative Qualitative Corrosion Characterization of Uncoated Chromium-Alloyed Steel Bars Used in Concrete Reinforcement (Tombstone Test)	Formerly T MP18a.3. Published in 2017.	2021				
T 375M / T 375-17	----	----	Identification of Iron-Based Alloy Steel Bars for Concrete Reinforcement or Dowels by Handheld X-Ray Fluorescence (XRF) Spectrometer	Formerly T MP18b.1. Published in 2017.	2021				
T 376M / T 376-17	----	----	Macrocell Slab Chloride Threshold	Formerly T MP18a.4. Published in 2017.	2021				
M 32M / M 32-09 (2013)	A82 / A82M-07	A82 / A82M-07	Steel Wire, Plain, for Concrete Reinforcement	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset
M 55M / M 55-09 (2013)	A185 / A185M-07	A185 / A185M-07	Steel Welded Wire Reinforcement, Plain, for Concrete	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset
M 221M / M 221-09 (2013)	A497 / A497M-07	A497 / A497M-07	Steel Welded Wire Reinforcement, Deformed, for Concrete	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset
M 225M / M 225-09 (2013)	A496 / A496M-07	A496 / A496M-07	Steel Wire, Deformed, for Concrete Reinforcement	Sunset - do not include in 2018 edition.	2017	TS4f_17-01	Passed	(2017 Fall)	Passed - sunset

Standard Method of Test for

Mass [Weight] and Diameter for
Carbon-Steel for Steel Wire and
Welded Wire Reinforcement for
Concrete

AASHTO Designation: TP XXX - 20

Technical Section: 4f, Metals

Release: Group 2 (June)



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

Mass [Weight] and Diameter for Carbon-Steel for Steel Wire and Welded Wire Reinforcement for Concrete

AASHTO Designation: TP XXX - 20



Technical Section: 4f, Metals

Release: Group 2 (June)

1. SCOPE

- 1.1. This test method covers procedures for determining the mass [unit weight] and diameter of Steel Wire and Welded Wire Reinforcement, Plain and Deformed for conformance with M 336.. A representative specimen of wire is tested to determine its diameter and/or unit weight of the wire. The tests herein described are used to determine the minimum properties of the wire in the product manufacturing specifications where indicated. Variations in testing methods are to be avoided and standard methods of testing are to be followed to obtain reproducible and comparable results.
- 1.2. The final results determined by this test method shall be expressed in inch-pound units except as indicated.
- 1.3. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- M 336, Standard Specification for Steel Wire and Welded Wire, Plain and Deformed, for Concrete Reinforcement.
- ASTM Standards:*
- E29, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. SIGNIFICANCE AND USE

- 3.1. This test method provides a standard method for determining the mass [unit weight] of deformed wire and diameter of smooth wire for comparison with specification requirements.

4. SAMPLING

- 4.1. Test specimens for testing mass and/or diameter properties of plain and deformed wire shall be full wire sections obtained from ends of wire coils or during the manufacturing for wire or from finished welded wire reinforcement sheets or rolls. The specimens shall be of sufficient length to perform testing described herein.
- 4.2. Test specimens for testing mass and/or diameter properties of plain and deformed welded wire reinforcement shall be obtained by cutting from the finished welded wire reinforcement a full width section of sufficient length to perform testing described herein.
- 4.3. If any test specimen exhibits obvious imperfections that are not representative of the product it shall be discarded and another specimen substituted.

5. DEFORMED, CONCRETE REINFORCEMENT MASS [UNIT WEIGHT] PROCEDURE

- 5.1. Straighten test specimens and ensure that the samples are of sufficient length for accurate measurements.

Note 1: Sample length from welded wire reinforcement is dependent on sheet spacings which can range from 2 X 2 to various X various. It is not recommended to use wires less than 4 inches in length.

- 5.2. Square each end of the wire specimen using a grinding wheel or any other suitable means to ensure that the length measurement is accurate.
- 5.3. Determine the length of the specimen using a calibrated/verified caliper or metal rule to the nearest 0.001 inch.
- 5.4. Place the specimen on a scale and record the weight in grams to the nearest 0.01 gram.
- 5.5. Determine the mass [weight] of the specimens to the nearest 0.001 lb/ft.

- 5.6. *Calculation*

- 5.6.1. $C = [W / L] \times 12/453.592$

where:

C = Weight per foot

L = Length in inches

W = Weight in grams

6. PLAIN, CONCRETE REINFORCEMENT DIAMETER PROCEDURE

- 6.1. Determine the diameter of the specimen using a calibrated/verified caliper or micrometer to the nearest 0.001 inch.
- 6.1.1. A minimum of two diameter readings shall be taken, rotating the specimen 90 degrees, at a location. Three locations shall be measured over the length of the specimen. All six readings are then averaged.

7. REPORT

- 7.1. Mass [unit weight] of deformed, concrete reinforcement is expressed in mass [unit weight] per foot.
- 7.2. Report the mass [unit weight] to the nearest 0.001 lb/ft.
- 7.3. Diameter of plain, concrete reinforcement is expressed in inches.
- 7.4. Report the individual and average diameter readings to the nearest 0.001 inch.

8. PRECISION AND BIAS

- 8.1. The precision of this test method is based on data points collected from the NTPEP Steel Wire and Welded Wire Reinforcement audit program from the 2017 and 2018 audit seasons. See Table 1 for a statistical summary of the test results.

Note 2 - S_r means the standard deviation of r (repeatability between individuals). S_R means the standard deviation for R (repeatability between laboratories).

Table 1—Mass / Diameter

Test	\bar{x}_r	S_x	\bar{x}_R	S_R	r	R
Weight per foot	0.190338	0.001355	0.199039	0.001171	1.3%	0.6%
Diameter	0.100542	0.001034	0.200186	0.000963	0.6%	0.4%

- 8.1.1. *Repeatability*—Two test results obtained within one laboratory shall be judged not equivalent if they differ by more than the “ r ” value for that material; “ r ” is the interval representing the critical difference between two test results for the same material, obtained by the same operator using the same equipment on the same day in the same laboratory.
- 8.1.2. *Reproducibility*—Two test results shall be judged not equivalent if they differ by more than the “ R ” value for that material; “ R ” is the interval representing the difference between two test results for the same material, obtained by different operators using different equipment in different laboratories.
- 8.1.3. Any judgment in accordance with these two statements would have an approximate 95 percent probability of being correct.
- 8.2. *Bias*—At the time of the study, there was no accepted reference material suitable for determining the bias for this test method; therefore, no statement on bias is being made.
- 8.3. *Precision*—The precision statement was determined through statistical examination of one hundred and fifty-three results, from twenty-five laboratories, on two materials.

Zwanka, Merrill E

From: Miljus, George (NSBHM) <george.miljus@nucor.com>
Sent: Friday, May 31, 2019 11:31 PM
To: Zwanka, Merrill E
Cc: Soneira, Casey; Ingram, Steven
Subject: RE: 4f / ASTM Metals update
Attachments: AASHTO M31 and ASTM A615_A706 R4.pptx

*** This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. ***

Hi Merrill,

I've attached the short presentation we gave at the Spring ASTM meeting for A615/A706. Several points that were expressed, but not clear in the presentation concerned the GR40 and GR75 weldable in M31. We could not find anyone in the industry that used or produced these two grades. From an ASTM an ACI perspective, we're trying to simplify the rebar specs as much as possible. With the latest additions of GR80 and GR100 to A615 and proposed GR100 to A706, the inventory situation for the producers, fabricators, & contractors is becoming an issue. This is the main reason why we relegated GR75 in A615 to an Annex, and removed it from the main Grade table.

That having been said, if there is a need for a GR40 weldable, I'm certain the industry would produce it. I spoke with Chris Hahin (IDOT) after the meeting and he mentioned he had requested a GR40 'W' for M31. I stated many producers provide a GR40 rebar for the mining industry with a low carbon content that would easily pass the low CE of the AWS specification. We also discussed that a GR40 weldable would not be any issue for the industry if it did not have to marked with a 'W'. The low carbon GR40 rebar made for the mining industry has no special markings, only maximum yield and tensile values which ensure a low carbon/alloy content.

As outlined in the powerpoint, the ACI 318 Building Code committee is driving several changes in A615 and also A706. Nevertheless, when the ACI members were drafting rebar changes needed for their new building code requirements, we at ASTM let them know of the needs of the other industries (bridge/highway, mining, anchor bolt, etc.) so we could find a compromise that would satisfy all. The proposed changes for A615 and A706 on the slides are fairly significant. Of course there is concern that the mills' Certified Test Reports will be invalid if the ASTM and AASHTO M31 specs aren't aligned.

I understand your next meeting is in Baltimore. Is it in June? I would like to attend if possible. Also, I will forward another powerpoint that explains the upcoming changes in A615 & A706 with some detail. I know this is a lot of information; it sounds a little better if I can explain in person; feel free to contact me.

Best Regards,

George

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ASTM A706 (Proposed / Balloted)

TABLE 2 Tensile **Test** Requirements

	Type W				Type D
	Grade 60 [420]	Grade 80	Grade 80 [550]	Grade 100 [690]	
Tensile strength, min, psi [MPa]	80 000 [550]	100 000 [690]	100 000 [690]	117 000 [805]	
Yield strength, min, psi [MPa]	60 000 [420]	80 000	80 000 [550]	100 000 [690]	
Yield strength, max, psi [MPa]	78 000 [540]	98 000	98 000 [675]	118 000 [815]	
Minimum ratio actual tensile strength divided by actual yield strength	1.25	1.25	1.25	1.17	
Elongation in 8 in. [200 mm], min, %					
Bar Designation Nos.					
3, 4, 5, 6 [10, 13, 16, 19]	14	12	12	10	
7, 8, 9, 10, 11 [22, 25, 29, 32, 36]	12	12	12	10	
14, 18 [43, 57]	10	10	10	10	