



Stabilizer Bars

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose/Material Description. The purpose of this specification is to define the materials and coatings for solid and tubular suspension stabilizer bars.

1.2 Symbols. Not applicable.

1.3 Applicability. Stabilizer bars are commonly specified for front and rear suspensions on nearly all cars and trucks.

1.4 Remarks. Stabilizer bars (also known as; stabar, anti-roll bar, anti-sway bar, roll bar, sway bar) are springs specified to tune vehicle ride, handling, and steering by managing weight transfer and body lean during cornering. A spring is an energy storage device that stores elastic energy. Springs are normally made from high strength materials. The high strength materials described by this specification are heat treated alloy steels.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM A29	ASTM E18	EN 10305-1	SAE J441
ASTM A513	ASTM E45	EN 10305-3	SAE J827
ASTM A519	ASTM E92	ISO 2808	SAE J2441
ASTM A751	ASTM E112	ISO 26910-1	
ASTM E8	DIN 50601	JIS G0551	
ASTM E10	EN 10247	SAE J419	

2.2 GM Standards/Specifications.

GMW3059	GMW14729	GMW14872	GMW15282
GMW3286	GMW14829	GMW15272	GMW15891
GMW14700			

2.3 Additional References. Not applicable.

3 Requirements

3.1 Material. Various alloy steels are utilized in the manufacture of stabilizer bars.

3.2 Form. Stabilizer bars can be designed utilizing tubular steel or solid steel bar products based on design requirements. GM may specify the stabilizer bar as tubular or solid in the engineering requirements. The supplier shall select the form of stabilizer bar if not predefined by GM.

3.2.1 Tubular or Solid Stabilizer Bars. Tubular stabilizer bars can be manufactured from seamless or electric resistance welded tubing. Electric resistance welded stabilizer bars may require seam orientation to a low stress location on the stabilizer bar during manufacture. Solid stabilizer bars are manufactured from as rolled steel rounds. Product validation testing shall be conducted on production intent tubing or solid material.

3.2.1.1 Seamless Tubing. Seamless tubing outside diameter and wall thickness tolerances from the tubing manufacturer shall meet ASTM A519 or EN 10305-1. The stabilizer bar manufacturer shall select one of the tolerance specifications for the validated and released stabilizer bar. The outside diameter and wall thickness apply to the as received stabilizer bar. Wall thinning and out of round dimensions due to stabilizer bar manufacture shall be defined on the drawing. Seamless tubing may be surface prepared or additionally cold drawn to meet durability requirements as determined by the stabilizer bar manufacturer.

3.2.1.2 Electric Resistance Welded Tubing. Electric resistance welded tubing may be drawn over mandrel or hot stretch reduced. Electric resistance welded tubing outside diameter and wall thickness tolerances from the tubing manufacturer shall meet ASTM A513 or EN 10305-3. The stabilizer bar manufacturer shall select one of the tolerance specifications for the validated and released stabilizer bar. Wall thinning and out of round dimensions due to stabilizer bar manufacture shall be defined on the drawing. Welded seam quality shall meet ASTM A513 requirements. Electric Resistance Welded tubing may be surface prepared or additionally cold drawn to meet durability requirements as determined by the stabilizer bar manufacturer.

The weld curl is generated during the forging phase of the weld operation where the edges of the steel are pushed together, and the oxides are extruded in the form of a curl. The weld curl on the outside diameter shall be removed. The inner diameter weld curl may be removed by inner diameter (ID) scarfing during the weld operation. The decision to remove the ID curl is at the stabilizer bar manufacturers discretion to meet durability or manufacturing requirements.

3.2.1.3 Solid Bars. Tolerances from specified size and out of roundness for hot-roll as-rolled solid round bars are shown in Table 1. Solid bars may be surface prepared or additionally cold drawn to meet durability requirements as determined by the stabilizer bar manufacturer. Tolerances for surface-prepared bars shall be noted on the part drawing.

Table 1: Size and Out of Round Tolerance for Hot Roll as Rolled Bar
(all dimensions in millimeters (mm))

Specified Size	Tolerance for Specified Size	Out of Round ^{Note 1, Note 2}
Over 7 to 11 incl.	± 0.15	0.22
Over 11 to 15 incl.	± 0.18	0.27
Over 15 to 19 incl.	± 0.20	0.30
Over 19 to 100	1% of specified size	1.5% of specified size

Note 1: Out of Round is the difference between the maximum and minimum diameters of the bar, measured at the same cross section.

Note 2: The tolerance shall be rounded to the nearest 0.1 mm after calculation.

3.2.2 Chemical Composition. The chemical compositions of alloy steel grades for stabilizer bar applications are shown in Table 2. Steel composition based on product analysis to be determined per ASTM A751. Chemical composition of the stabilizer bar is the referee method.

The grade shall be selected by the stabilizer bar manufacturer from Table 2 and identified on the engineering drawing. Selection of a steel not described in Table 2 shall be approved by GM Engineering. Steels not meeting the compositions described in Table 2 must have the complete chemical composition identified on the GM drawing. The steel compositions listed in Table 2 are normally restricted to a tighter tolerance for certain elements by the stabilizer bar manufacturer in order to provide reduced variation during heat treatment. Alternatively, steel hardenability may be specified using either Jominy or ideal diameter methods.

Table 2: Chemical Composition, Weight% ^{Note 1}

Grade	Regional or Common Names ^{Note 2}	Alloy Description and Form	C	Mn	Si	P	S	Cr	Ni	Mo	Al	Ti	B
C90	1090	Carbon Steel Solid, Forged and Air cooled	0.85 to 0.98	0.60-0.90	0.15 to 0.35	0.03	0.05	-	-	-	-	-	-
C67S	1070	Carbon Steel Solid, Forged and Air cooled only	0.67 to 0.73	0.60 to 0.90	0.15 to 0.35	0.025	0.025	0.4	0.4	0.1	-	-	-
65MnCr4A	5160H, SUP-9A	Chrome Alloy Steel Solid	0.55 to 0.65	0.65 to 1.10	0.15 to 0.35	0.03	0.04	0.60 to 1.00	-	-	-	-	-
65MnCr4	5160	Chrome Alloy Steel Solid	0.56 to 0.64	0.75 to 1.00	0.15 to 0.35	0.03	0.04	0.70 to 0.90	-	-	-	-	-
60SiCr3	9259	Chrome Silicon Alloy Steel Solid	0.56 to 0.64	0.75 to 1.00	0.70 to 1.10	0.03	0.04	0.45 to 0.65	-	-	-	-	-
60Si7	SUP-7, 9260	Silicon Alloy Steel Solid	0.56 to 0.64	0.70 to 1.00	1.80 to 2.20	0.035	0.035	-	-	-	-	-	-
55SiCr7	9254, SUP-12	Chrome Silicon Alloy Steel Solid	0.52 to 0.60	0.70 to 1.00	1.50 to 1.80	0.05	0.05	0.63 to 0.77	-	-	-	-	-
55Cr3	5155, SUP-9	Chrome Alloy Steel Solid	0.52 to 0.60	0.60 to 0.95	0.15 to 0.30	0.035	0.035	0.65 to 0.95	-	-	-	-	-
38MnV6 ^{Note 3}	15V38	Manganese Vanadium Tubular	0.34 to 0.42	1.20 to 1.60	0.15 to 0.80	0.035	0.035	0.4	0.4	0.1	-	-	-
38MnCr ^{Note 4}	PDT2000	Manganese Chrome	0.36 to 0.48	0.80 to 1.50	0.05 to 0.30	0.02	0.01	0.05 to 0.40	0.35	0.25	0.05	0.05	0.005
38Mn6 ^{Note 5}	1538	Manganese Tubular	0.34 to 0.42	1.40 to 1.65	0.15 to 0.45	0.035	0.035	0.4	0.4	0.1	-	-	-
34MnCrMoTiB	PDT1800	Manganese Chrome Boron Titanium	0.31 to 0.38	1.10 to 1.60	0.10 to 0.30	0.02	0.01	0.10-0.25	0.2	0.05 to 0.25	-	0.02-0.05	0.001 to 0.005
34 MnB5	15B31	Manganese Boron Tubular	0.31 to 0.39	1.10 to 1.50	0.15 to 0.35	0.02	0.005	0.05 to 0.25	-	-	-	0.020 to 0.055	0.001 to 0.005
26MnB5	15B26	Manganese Titanium Boron Tubular	0.22 to 0.29	1.15 to 1.45	0.15 to 0.35	0.02	0.005	0.05 to 0.20	-	-	-	0.01 to 0.045	0.0015 to 0.0035
25 CrMo4	4130, SCM430	Chrome Moly Tubular	0.28 to 0.33	0.40 to 0.60	0.15 to 0.35	0.02	0.005	0.80 to 1.10	-	0.15 to 0.25	-	-	-
22MnCrTiB4	PDT1470	Manganese Chrome Titanium Boron Alloy Tubular	0.19 to 0.25	1.10 to 1.60	0.4	0.03	0.015	0.10-0.60	-	-	0.02 to 0.05	0.01 to 0.05	0.0008 to 0.005
20MnCrNiB	DP-2	Chrome Nickel Alloy Tubular	0.16 to 23	0.30 to 0.60	0.10 to 0.25	0.025	0.02	0.20 to 0.40	0.10 to 0.30	-	-	-	0.001 to 0.005
19MnB4	15B21	Manganese Boron Tubular	0.17 to 0.24	0.70 to 1.20	0.15 to 0.35	0.025	0.025	-	-	-	-	-	0.0008 to 0.005

Note 1: Product Analysis. Individual composition values are maximum. Iron is balance. All compositions are weight percentage. Maximum content of unspecified residual elements are: 0.35% Cu, 0.25% Ni, 0.20% Cr, and 0.06% Mo.

Note 2: Regional or Common Names are listed for information only. The Regional or Common name steels must meet all requirements defined by this specification.

Note 3: V = 0.08 to 0.20.

Note 4: Cu = 0.20 maximum.