

	SURFACE VEHICLE INFORMATION REPORT	
	SAE	J401 MAR2012
	Issued Revised	1911-06 2012-03
Superseding J401 APR2000		
Selection and Use of Steels		

RATIONALE

A five year review has uncovered several references to obsolete specifications. Those defects are rectified by this revision.

1. SCOPE

The SAE system of designating steels, described in SAE J402, classifies and numbers them according to chemical composition. In the case of the dent resistant, high strength and ultra high strength steels in SAE J2340, advanced high strength steels described in SAE J2745, and the high strength steels in SAE J1442 and the high-strength carbon and alloy die drawn steels in SAE J935, minimum mechanical property requirements have been included in the designations. In addition, hardenability data on most of the alloy steels and some of the carbon steels will be found in SAE J1268.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J402	New Steel Designation System for Wrought or Rolled Steel
SAE J412	General Characteristics and Heat Treatments of Steels
SAE J935	High-Strength Carbon and Alloy Die Drawn Steels
SAE J1099	Technical Report on Low Cycle Fatigue Properties Ferrous and Non-Ferrous Materials
SAE J1268	Hardenability Bands for Carbon and Alloy H Steels
SAE J1442	High-Strength, Hot-Rolled Steel Bars

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Documents

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SAE J2340 Categorization of Properties of Dent Resistant, High Strength, and Ultra High Strength Automotive Sheet Steel

SAE J2745 Categorization and Properties of Advanced High Strength Automotive Sheet Steels

SAE AE-4 Fatigue Design Handbook

2.1.2 ASM Publications

Available from ASM, 9639 Kinsman Road, Materials Park, OH 44073-0002, Tel: 440-338-5151, www.asminternational.org.

The Selection of Steel for Metal Toughness, ASM Handbook, 9th Edition, Vol. 1, p. 403

Toughness and Fracture Mechanics, ASM Handbook, 8th Edition, Vol. 10, p. 30

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

More detailed information on the characteristics, application and heat treatment of SAE steels is given in the SAE Information Report J412 in the SAE Handbook. References 1–4, 7, 8, and 10 are representative of meaningful articles that have appeared in other publications. References 5 and 9 deal with the various tests for toughness and their significance. Reference 6 details the application of linear elastic fracture mechanics. Reference 11 fatigue strength and design.

- a. Kern, R. F., "Selection of Steels for Heat Treated Parts." *Metal Progress*, Vol. 94, No. 5, November, 1968, p. 60 and No. 6, December, 1968, p. 71.
- b. Weymueller, C. F., "Selecting Steels for Heat Treated Auto and Truck Parts." *Metal Progress*, Vol. 94, No. 4, October, 1968, p. 125.
- c. Fox, M. M., "Saving by Substituting for Alloy Steels." *Metal Progress*, Vol. 96, No. 6, December, 1969, p. 95.
- d. Kern, R. F., "Selecting Steels for Carburized Gears." *Metal Progress*, Vol. 102, No. 1, July, 1972, p. 53.
- e. "The Variations in Charpy V-notch Impact Properties in Plates." American Iron and Steel Institute, Washington, DC, 1989.
- f. Barsom, J. M. and Rolfe, S. T., "Fracture and Fatigue Control in Structures—Applications of Fracture Mechanics." 2nd Edition, Prentice-Hall, Inc., Englewood Cliffs, NJ, 1987.
- g. Nagaraja Rao, N. R., Lohmann, M., and Tall, L., "Effect of Strain Rate on the Yield Stress of Structural Steels." *Journal of Materials*, March, 1966.
- h. Barsom, J. M., "Material Considerations in Structural Steel Design." *Engineering Journal*, American Institute of Steel Construction, Chicago, IL, Vol. 24, No. 3, 1987.
- i. Barsom, J. M., "Properties of Bridge Steels." Vol. I, Chap. 3, *Highway Structures Design Handbooks*, American Institute of Steel Construction, Chicago, IL, May, 1991.