

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J132

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Oil-Tempered Chromium-Vanadium Valve Spring Quality Wire and Springs

1. **Scope**—This SAE Recommended Practice covers the mechanical and chemical requirements of oil-tempered chromium-vanadium valve spring quality wire used for the manufacture of engine valve springs and other springs used at moderately elevated temperatures and requiring high fatigue properties. It also covers the processing requirements of spring fabricated from this wire.
2. **References**
 - 2.1 **Applicable Publications**—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.
 - 2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.
HS 84—Manual on Shot Peening
 - 2.1.2 ANSI PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.
ANSI B32.4M—Preferred Metric Sizes for Round, Square, Rectangle, and Hexagon Metal Products
 - 2.1.3 ASTM PUBLICATIONS—100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.
ASTM A 232—Specification for Chromium-Vanadium Alloy Steel Valve Spring Quality Wire
ASTM A 232M—Specification for Chromium-Vanadium Alloy Steel Valve Spring Quality Wire (Metric)
3. **Wire**
 - 3.1 The wire shall conform to the oil-tempered requirements of ASTM A 232/A 232M.
 - 3.2 **Special Surface Inspection**—When specified, the entire length of every coil used by engine valve spring manufacturers shall be inspected for surface imperfections with a magnetic and/or eddy current defect analyzer or equivalent.

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4. Springs

- 4.1 Heat Treatment**—Springs coiled from this wire shall be stress relieved for a minimum of 30 min at heat unless otherwise agreed upon by purchaser and supplier. Normally the temperature used will be the maximum which will leave the original hardness of the wire essentially unchanged. Typical temperatures are 370 to 430 °C (700 to 800 °F).
- 4.2 Hardness**—Hardness of springs shall be measured on suitable ground flats for wire sizes 1.6 mm (0.062 in) and larger, or on ground-mounted sections for wire sizes of less than 1.6 mm (0.062 in). Hardness values shall conform to Tables 1A or 1B.

TABLE 1A—HARDNESS ⁽¹⁾, SI UNITS

	Wire Diameter ⁽²⁾ mm	Min	Max
R 15N	0.50	88.5	89.7
	0.80	88.0	89.3
	1.00	87.5	88.8
	1.40	86.9	88.3
R 45N	1.60	57.9	61.4
	2.00	56.4	59.4
	2.50	55.0	57.9
RC	3.50	48	51
	4.00	47	50
	5.00	46	49
	6.00	45	48
	8.00	43	47
	11.00	42	45

Values for intermediate sizes may be interpolated.

1. Hardness ranges indicated apply to finished springs and are subject to normal variations found in standard hardness testing procedures.
2. Preferred sizes. For a complete list refer to ANSI B32.4M.