Ford Motor Company

ENGINEERING MATERIAL SPECIFICATION

Material Name | Specification Number

STEEL FOR COLD FORMED COIL SPRINGS | **WSD-M1A310-A1/A4**

1. SCOPE

The materials described in these specifications are plain carbon and alloy spring steels which have been hardened and tempered prior to coiling.

2. APPLICATION

These materials were released originally for use in the manufacture of springs with wire diameters between 8 and 16 mm.

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 GENERAL REQUIREMENTS

Prior to hardening and tempering, the bar stock shall either be in the ground condition or have the decarburised layer removed.

3.3 REQUIREMENTS FOR FINISHED SPRINGS

3.3.1 GENERAL RESTRICTIONS

3.3.1.1 The component drawing may specify a restricted list of steel types together with other requirements such as hardness, surface condition, peening control, etc., which have been applied to springs that have successfully met the rig and durability requirements.

3.3.1.2 No steels other than those proved to be acceptable by prototype testing may be used in production unless prior approval from Ford Product Development is obtained.

3.3.1.3 The component engineer must be supplied with the composition and properties of each batch of prototype springs.

Date	Action	Revisions
2002 09 23	Revised	Updated and renumbered
1988 01 14	SM/ER 1620 TC	Released. K J Thurgood. EAO.

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3.3.2 CHEMICAL COMPOSITION

The spring manufacturer shall use steel that complies with one of the following compositions:

	A1 %	A2 %	A3 %	A4 %
Carbon	0.55-0.75	0.45-0.55	0.58-0.75	0.50-0.60
Silicon	0.10-0.35	0.10-0.35	0.10-0.35	1.20-1.60
Manganese	0.60-1.20	0.60-0.90	0.50-0.90	0.50-0.80
Phosphorus	0.030 max	0.030 max	0.030 max	0.030 max
Sulphur	0.030 max	0.030 max	0.030 max	0.030 max
Chromium	-	0.080-1.10	0.35-0.60	0.50-0.80
Vanadium	-	0.15 min	0.10-0.30	-

Type A4 is classified as a silicon steel

3.3.3 NON-METALLIC IMPURITIES

	INCLUSION TYPE			
	A		B	
	T	H	T	H
Silicon Steel	*	*	2.5	1.5
Non-Silicon Steel	*	*	2.5	1.5
	C		D	
	T	H	T	H
Silicon Steel	2.5	1.5	2	1.5
Non-Silicon Steel	1.5	1	2	1.5

*No requirement since % Sulphur is less than 0.035

The above requirement is either on billets to ASTM E45 Method A or on finished springs to FLTM EU-BA 51-2.

3.3.4 GRAIN SIZE

The steel shall have an austenitic grain size of 5 or finer.

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