

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

PISTON RING, ALLOY STEEL, COMPRESSION
PISTON RING, ALLOY STEEL, COMPRESSION

WSE-M1A309-A1
WSE-M1A309-A2

1. SCOPE

The material defined by these specifications is a chromium silicon alloy steel that will be heat treated to produce a quenched and tempered product with high strength and good relaxation properties at elevated temperatures.

2. APPLICATION

These specifications were released originally for material used for upper compression piston rings. It is also commonly used for springs.

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 CHEMICAL COMPOSITION (WEIGHT PERCENT)

Carbon	0.50 - 0.60
Manganese	0.50 - 0.80
Phosphorus	0.035 max
Sulfur	0.040 max
Silicon	1.20 - 1.60
Chromium	0.50 - 0.80

The material is comparable to UNS-G92540/SAE J1249 9254 alloy steel.

3.3 HARDNESS HRC

(ISO 6508/ASTM E 18)	A1	A2
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Finished ring - after processing	45.5 - 53.5	40 - 46
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Average of three determinations around each part with individual values no more than two points below the minimum specified.

Date	Action	Revisions
2002 09 23	Revised	Updated and renumbered
1993 01 28	NE01-E-10127076-076	Revised & Updated P. Lee
1988 10 25	NE01E10000474027	Released H. Nikkel

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3.4 MICROSTRUCTURE

The finished part must have a uniform microstructure of tempered martensite with no areas of complete decarburization or significant amounts of residual carbides. Partial decarburization, if present, must not exceed 0.025 mm in depth.

4. GENERAL INFORMATION

The information below is provided for clarification and assistance in meeting the requirements of these specifications.

4.1 MECHANICAL PROPERTIES
(ISO 6892/ASTM E 8)

(Test samples from uncoiled wire that was heat treated along with the rings.)

	A1	A2
Tensile Strength, MPa, min	1450	1250
Yield Strength, MPa, min	1300	1150
Elongation, %, min	4	4