NICKEL, CHROMIUM, MANGANESE AND SILICON ALLOYED ELECTRODE — **WSD-M6A105-A**

NICKEL, CHROMIUM, MANGANESE AND SILICON ALLOYED ELECTRODE, GRAIN STABILIZED — **WSD-M6A105-A2**

NICKEL, MANGANESE AND SILICON ALLOYED ELECTRODE — **WSD-M6A105-A3**

NICKEL, CHROMIUM AND IRON ALLOYED ELECTRODE — **WSD-M6A105-A4**

1. SCOPE

The materials defined by these specifications are nickel, chromium manganese silicon alloys.

2. APPLICATION

These materials were originally released for side electrodes in spark plug applications.

3. REQUIREMENTS

3.0 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, %

	A	A2	A3	A4
Nickel	95 min	94.5 min	94.0 - 96.0	76.0 - 78.0
Chromium	2 max	2 max	0.20 max	14.0 - 15.5
Manganese	1.2 - 2.5	1.2 - 2.5	3.75 - 4.25	0.2 - 0.5
Silicon	0.6 max	0.6 max	0.75 - 1.25	0.2 - 0.5
Copper	0.5 max	0.5 max	0.10 max	0.5 max
Iron	1.0 max	2.0 max	0.50 max	7.0 - 8.0
Carbon	0.1 max	0.1 max	0.05 max	0.05 max
Titanium	---	0.2 - 0.4	0.15 max	0.35 max
Zirconium	---	0.1 - 0.2	---	---
Aluminum	---	---	0.10 max	0.25 max

Chemical composition, including permitted impurity levels, will form part of the agreed control plan.

Date	Action	Revisions
2003 10 09	Revised	Para 3.0 inserted; para 3.1, 3.5 and 4 deleted
1993 06 10	C10309021	Released A4 J.C. Webster NAAO, R.T. Cooper EAO
1988 02 25	SM/ER 2761TC	Final Release N.P. Riley, EAO

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3.3 MECHANICAL PROPERTIES

3.3.1 Tensile Properties (ISO 6892/ASTM E 8M)

	A/A2	A3	A4
Ultimate Tensile Strength, MPa	430 - 500	N/A	570 - 620
0.2 Proof Stress, MPa, min	180	N/A	250 - 300
Elongation, %	35 min	30 - 42 in 250 mm	---
Round Material, % (Solid Centre Electrode)	---	---	8 - 25
Rectangular Material, %	---	---	34 - 42
Round Material, % (Copper-cored Centre Electrode, Gauge Length: 200 mm)	---	---	46 - 72

3.3.2 Hardness, HV (ISO 6507/2; ASTM E 384)

	A/A2	A3	A4
	100 - 150	N/A	---
Round Material (Solid Centre Electrode)	---	---	220 - 250
Rectangular Material	---	---	140 - 170
Round Material (Copper-cored Centre Electrode)	---	---	120 - 160

The processing route and optimum mechanical properties for fabrication, welding and service performance shall form part of the agreed control plan.

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