



## Nitrode®

No other cap electrode can match Nitrode® for its cost-effective, high quality performance in resistance-welding applications

The Nitrode cap is a cold-formed alloy of copper dispersion strengthened with aluminum oxide. It consistently outperforms copper chrome and copper chrome zirconium electrodes in resistance to annealing, consistent electrical conductivity, electrode life and lower maintenance costs.

### Longer weld life

Nitrode caps last longer than conventional electrodes by resisting annealing. The contact surface of a resistance welding electrode reaches temperatures of up to 900°C during the welding process. Nitrode electrodes resist the mushrooming effect on the contact surface of the electrode, allowing more welds before tip dressing, heat stepping or tip change.

### Non-stick

Nitrode caps reduce sticking of electrodes on galvanized steel and other coated metals. The refractory qualities of  $Al_2O_3$  reduce the infusion of liquid and gaseous zinc into the copper matrix.

### Reduces energy requirements

Nitrode requires lower current when used on both sides of the weldment. Current settings on your welder can be reduced by up to 10% from conventional settings, with no loss of weld quality. Nitrode allows for smoother startups with no warm ups, meaning fewer electrode changes and fewer interruptions for less maintenance downtime than other conventional electrodes.

### Works on all steels

Nitrode has demonstrated superior welding performance for a variety of steels, including HSS, HSLA, micro-alloyed, nitrogenized, low-carbon, electrolytically zinc-coated, galvanized and others.

### Nitrode® cuts your company's costs

Nitrode resists mushrooming for improved up-time from reduced tip changes, less tip-dressing, and lower current settings will increase your company's productivity, and cut costs.



### About Luvata

Luvata is a world leader in metal solutions manufacturing and related engineering services to industries such as renewable energy, automotive, healthcare, and power generation and distribution. The company's continued success is attributed to its longevity, technological excellence and strategy of building partnerships beyond metals. Employing over 1,400 staff in 7 countries, Luvata works in partnership with customers such as ABB, CERN, Siemens and Toyota. Luvata is a group company of Mitsubishi Materials Corporation.



## Specification - Quality

Alloy	C15760 CuAl <sub>2</sub> O <sub>3</sub> 1.1, EN ISO 5182 C20/1, RWMA Class 20		
Chemical composition	Aluminum 0.60% as Al <sub>2</sub> O <sub>3</sub> 1.1% Cu balance.		
Physical material properties at 20°C	Mass	8.81g/cm <sup>3</sup>	
	Specific heat	376 J/kg.K	
	Thermal conductivity	322 W/m.K	
	Expansion coefficient (20-300°C)	16.6 x 10 <sup>-6</sup> m/mK	
	Electric conductivity (solution-annealed and hardened)	min. 45 S/m	
	Softening temperature	1083°C	
Dimensions and tolerances	To ISO 5821 or other standards as required. Special electrodes to customer drawing.		
Packaging	Most items in cartons of 500 pieces.		
Documentation	Acceptance test certificate EN 10204 3.1 B possible if desired against a charge.		
Area of application	Male and female resistance welding electrode Backing dies - series and indirect Projection welding electrodes		

Errors and omissions excepted. Values given are industry standards.

## Mechanical Specifications - Quality

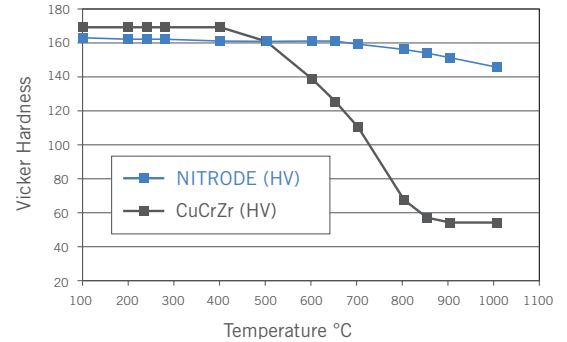
Form of supply	Tensile strength [N/mm <sup>2</sup> ]	0.2% Offset yield strength [N/mm <sup>2</sup> ]	Elongation AS [%]	Hardness HV
Electrodes	≥ 572	≥ 544	≥ 5	≥ 164

## Physical Properties

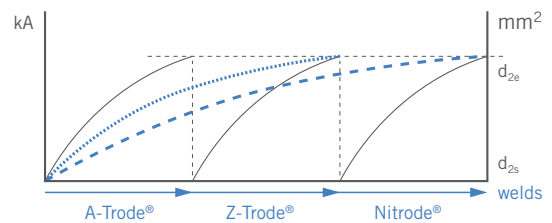
Hardness at ambient temperature:	Minimum 75 HRB
Conductivity:	Minimum 75% IACS

## Traceability

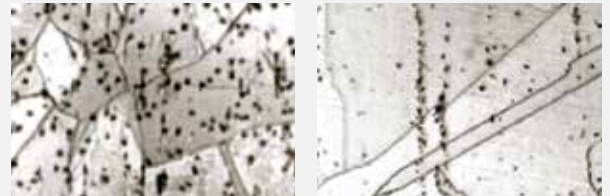
All materials are fully traceable. Nitrode electrodes can be recognized by their single knurls.



Hardness at high temperature



Heat stepping



CuCrZr before and after annealing at 900°



Nitrode before and after annealing at 900°



CuCrZr after 1200 welds

Nitrode after 1200 welds

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