



AN INNOVATIVE TOOL MATERIAL FOR HIGH STABILITY IN RESISTANCE WELDING

# ELKONITE® COPPER-TUNGSTEN



**CMW® ELKONITE® COPPER-TUNGSTEN** » Elkonite® is the registered trade mark of CMW used to identify a group of metal compositions whose elements consist basically of the refractory metals tungsten, molybdenum and tungsten carbide combined with copper. Combinations of these elements produce dense, hard metals of superior wear resistance and strength at elevated temperatures, coupled with good thermal and electrical conductivity. The mechanical and physical properties of the CMW® Elkonite® materials make them particularly suitable as the die inserts and facings for volume projection welding, flash and butt welding, electrical upsetting and electroforging applications.

Elkonite® Copper-Tungsten is also used successfully as facing on spot welding electrodes where heat balance or mechanical wear resistance are required. The initial premium cost of Elkonite® Copper-Tungsten is offset by lower production cost per weld due to long die life and less electrode dressing time. ***The high stability of Elkonite® Copper-Tungsten insures uniform heating and prevents misalignment, resulting in a higher quality weld.***



## BENEFITS AND RESULTS

- » COMPOSITE MATERIAL COMBINING REFRACTORINESS (TEMPERATURE RESISTANCE) WITH HIGH ELECTRICAL CONDUCTIVITY
- » GOOD WEAR RESISTANCE
- » EXCELLENT ARC RESISTANCE
- » CAN BE RESURFACED MANY TIMES
- » CAN BE BRAZED INTO COPPER PLATENS OR OTHER BACKING MEMBERS
- » STRONG AND RIGID

**RESISTANCE WELDING**

## TYPICAL ELKONITE® COPPER-TUNGSTEN PROPERTIES

CMW® GRADE	COMPOSITION % BY WEIGHT	CLASS #	RWMA GROUP B MATERIALS	HARDNES ROCKWELL	ELECTRICAL CONDUCTIVITY % IACS	ULTIMATE TENSILE STRENGTH PSI	CROSS BREAKING STRENGTH PSI
ELKONITE® 1W3	55W, 45Cu	10	10.7445	77 B	53	63,000	110,000
ELKONITE® 3W3	68W, 32Cu	---	---	90 B	50	75,000	130,000
ELKONITE® 5W3	70W, 30Cu	---	---	95 B	48	85,000	140,000
ELKONITE® 10W3	75W, 25Cu	11	11.744	98 B	45	90,000	150,000
ELKONITE® 30W3	80W, 20Cu	12	12.7435	103 B	41	98,000	170,000
ELKONITE® 3W53	68W, 32Cu*	---	---	105 B	30	120,000	180,000
ELKONITE® 10W53	75W, 25Cu*	---	---	109 B	28	160,000	200,000
ELKONITE® TC5	50WC, 50Cu	---	---	94 B	45	70,000	140,000
ELKONITE® TC10	56WC, 44Cu	---	---	100 B	42	75,000	160,000
ELKONITE® TC20	70WC, 30Cu	---	---	37 C	30	85,000	180,000
ELKONITE® TC53	70WC, 30Cu*	---	---	47 C	18	150,000	220,000

NOTE: All properties shown are typical and should not be used for specifications. \*Cu Alloy

### TYPICAL USES

**Elkonite® 1W3 and Elkonite® 3W3** » Elkonite® 1W3 and Elkonite® 3W3 materials are generally used for flash and butt welding die inserts where higher electrical and thermal conductivity is necessary and where a degree of malleability is desirable. These materials are also used for spot welding (as a radius faced electrode) low conductivity ferrous metals such as stainless steel.

**Elkonite® 5W3 and Elkonite® TC5** » Elkonite® 5W3 and Elkonite® TC5 materials are normally used for light duty projection welding dies where welding pressures are not extreme.

**Elkonite® 10W3** » Elkonite® 10W3 material is used for electrode and die inserts in most flash and butt welding dies and for projection welding dies where welding pressures are moderate. It is also used for light electrical upsetting, electroforging dies and seam welder bushing inserts.

**Elkonite® 30W3 and Elkonite® TC10** » Elkonite® 30W3 and Elkonite® TC10 materials are recommended for volume projection welding dies where the pressures involved are relatively high. Electrical upsetting of non-ferrous metals and low carbon steel is usually accomplished by the use of such Elkonite® materials as die facings. Cross-wire welding of large, diameter wire and rod is accomplished with such Elkonite® materials.

**Elkonite® 3W53 and Elkonite® 10W53** » Elkonite® 3W53 and Elkonite® 10W53 are heat treatable grades of Elkonite® materials supplied in the fully heat treated condition. If silver brazed to a die backing, such Elkonite® materials should be heat treated after brazing. These harder grades are used primarily for electroforging and electrical upsetting dies, where temperatures and pressures are comparatively high.

**Elkonite® TC20 and Elkonite® TC53** » Elkonite® TC20 and Elkonite® TC53 materials are extremely hard and wear resistant. Elkonite® TC20 material, while somewhat difficult to machine, may be machined using carbide tipped tools. Elkonite® TC53 material is a heat treatable grade of such high hardness that machining operations are impractical and the material must be ground. Such Elkonite® materials are customarily used for special applications of electrical upsetting and electroforging.

**About the Company** » With its roots to 1916 as the Mallory Metallurgical Company, CMW operates in three primary business units dedicated to silver-based electrical contacts, tungsten-based high density metals and copper-based resistance welding consumables. Numerous organizations have repeatedly recognized our company and its associates for safety, quality and continuous improvement programs. With an employment base including over 1,000 years experience in chemistry, metallurgy, manufacturing engineering and other industrial technologies, CMW operates a range of capabilities across the spectrum of manufacturing in its 6+ acre complex in the center of the United States. ***We stand ready to assist you!***

CMW is ISO 9001:2000 certified.

***For more information about CMW® Elkonite® Copper-Tungsten, please call our office or visit our website at [www.cmwinc.com](http://www.cmwinc.com).***

# RESISTANCE WELDING