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 ELKONITE® materials make them particularly suitable as the die inserts and facings for volume projection welding, cross-wire welding of large, heavy metal parts, and in some electrical upsetting operations.

### TYPICAL USES

**ELKONITE® 1W3 and 3W3 alloys** 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 TC5 alloys** are normally used for light duty projection welding dies where welding pressures are not extreme.

**ELKONITE® 10W3 alloy** 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 TC10 alloys** 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® 3W3 and 10W3 alloys** 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 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 electro-forging.

**ELKON® 100W** is extremely hard and its ductility is relatively low. It cannot be machined but may be ground to the required shape. It does not alloy appreciably with nonferrous materials and is used for cross-wire welding of metals such as copper and brass. It is also used for electrobrazing electrode material and for some electrical upsetting operations.

**ELKON® 100M** is used principally for electrobrazing electrode material and for cross-wire welding of nonferrous metals. It is not as hard as ELKON® 100W material and may be machined or drilled to fit the parts to be joined. A typical application of this material, as an electrode, is the welding or brazing of braided or solid copper conductors to ferrous or nonferrous terminals, lugs or fittings.

**ANVILOY® 1150** material is used in electrobrazing applications where heat balance is important. The ANVILOY® 1150 material also has good anti-sticking qualities and good high temperature abrasion and hardness properties. The oxidation resistance of both materials is excellent up to 1100°F.

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**CMW GRADE** | **Type of Material** | **Class #** | **R.W.M.A. Group B Material** | **Hardness** | **Conductivity %I.A.C.S.** | **Ultimate Tensile Strength, psi** | **Cross Breaking Strength psi**
--- | --- | --- | --- | --- | --- | --- | ---
ELKONITE® 1W3 | Tungsten-Copper | 10 | 10.7450 | 77 B | 53 | 63,000 | 110,000
ELKONITE® 3W3 | Tungsten-Copper | — | — | 90 B | 50 | 75,000 | 130,000
ELKONITE® 5W3 | Tungsten-Copper | — | — | 95 B | 48 | 85,000 | 140,000
ELKONITE® 10W3 | Tungsten-Copper | 11 | 11.7400 | 98 B | 45 | 90,000 | 150,000
ELKONITE® 30W3 | Tungsten-Copper | 12 | 12.7450 | 103 B | 41 | 98,000 | 170,000
ELKONITE® 3W3 | Tungsten-Copper Alloy | — | — | 105 B | 30 | 120,000 | 180,000
ELKONITE® 10W3* | Tungsten-Copper Alloy | — | — | 109 B | 28 | 160,000 | 200,000
ELKONITE® TC5 | Tungsten Carbide-Copper | — | — | 94 B | 45 | 70,000 | 140,000
ELKONITE® TC10 | Tungsten Carbide-Copper | — | — | 100 B | 42 | 75,000 | 160,000
ELKONITE® TC20 | Tungsten Carbide-Copper | — | — | 97 C | 30 | 85,000 | 180,000
ELKONITE® TC53* | Tungsten Carbide-Copper Alloy | — | — | 97 C | 30 | 85,000 | 180,000
ELON® 100W | Tungsten | 13 | 13.7400 | 39 C | 30 | 150,000 | 200,000
ELON® 100M | Molybdenum | 14 | 14.4230 | 90 B | 30 | 80,000 | 120,000
ANVILOY® 1150** | Molybdenum-Nickel-Iron-Molybdenum | — | — | 34 C | 13 | 140,000 | 280,000

Note: All properties shown are TYPICAL and should not be used for specifications

* Properties are in fully heat treated condition

** Hardness is 56 HRA at 1475 °F (800°C)