



MolyCarb™

EDM WIRE

Specifically Engineered For
Electrodischarge Machining

PURE
MOLYBDENUM
CORE

OXIDE
LAYER

GRAPHITE
LAYER



GENERAL  ELECTRIC

GENERAL ELECTRIC COMPANY
COMPONENTS QUARTZ MARKETING & SALES OPERATION

MolyCarb™ EDM WIRE

A significantly improved cutting wire that offers these specific advantages.

- Faster Cutting Speeds
- Excellent Surface Finishes
- Intricate Cuts in Thicker Workpieces

A GE Development

Since molybdenum wire has a much higher melting point and higher tensile strength than other materials commonly used for electrodischarge machining, it can resist the tendency to soften at the temperatures that occur during EDM operations.

For machining through thick workpieces and for cutting tight corners, General Electric developed small diameter molybdenum wire especially for EDM operations. This wire, Mo-EM wire, has found an important niche in the industry.

Improved Wire

Now GE has developed an improved material, MolyCarb™ EDM cutting wire. It retains all the desirable properties of Mo-EM wire and adds several important features of its own.

MolyCarb™ wire is an EDM quality wire with a coating of graphite over an intermediate layer of oxide. The oxide layer helps bond the graphite coating to the core wire, while the graphite serves two important functions: it lubricates the

wire through the wire guides on the EDM equipment and gives a major boost to the energy transfer during the spark discharge. Combining this with the superior conductivity of molybdenum (even better than that of brass) creates a very high discharge intensity. This, in turn, permits faster cutting speeds while maintaining an excellent surface finish.

Tapered Cuts

For tapered cuts, the lubricating effect of the graphite on the wire provides smooth passage through the wire guides, reducing the chatter that can occur at high back tension with some other materials.

Meets Specific Needs

MolyCarb™ wire is General Electric's response to the EDM industry's expressed need for a high tensile strength wire with faster cutting speeds. This has been achieved without sacrificing the trouble free performance, long continuous runs or high quality parts that users have come to expect from Mo-EM molybdenum cutting wires.

General Electric Company's development of Mo-EM molybdenum cutting wire provided a highly reliable material specifically tailored for EDM operations. The features of Mo-EM, in addition to those mentioned previously, include:

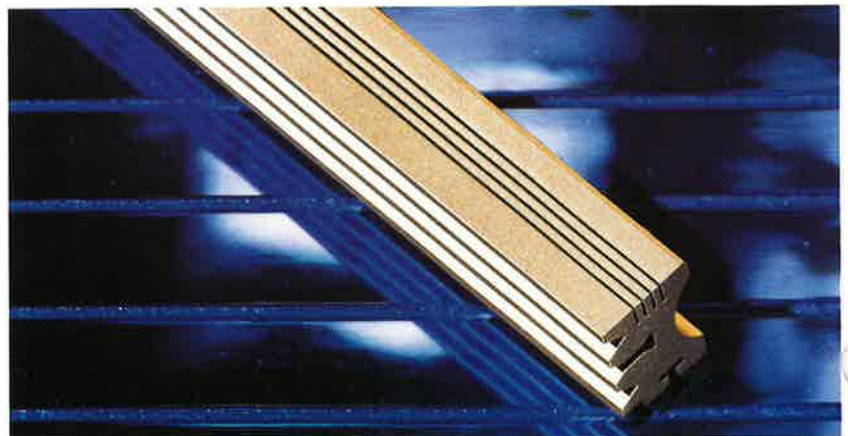
- Greater wire tension than more commonly used materials.
- Better accuracy and more consistent results in machining tall workpieces
- Stiffness at high tension and under a variety of operating conditions
- Uniform diameter from one end of spool to the other
- Availability in long continuous lengths
- Uniform quality from one lot of material to another

All these features are incorporated into MolyCarb™ EDM wire, with three additional benefits:

- Faster cutting speeds are possible
- It EDMs to an excellent surface finish
- It permits more intricate cuts in even thicker workpieces



MolyCarb™ EDM cutting wire can be recognized by its black surface finish. It is available in various mil diameters and on three different sized spools.

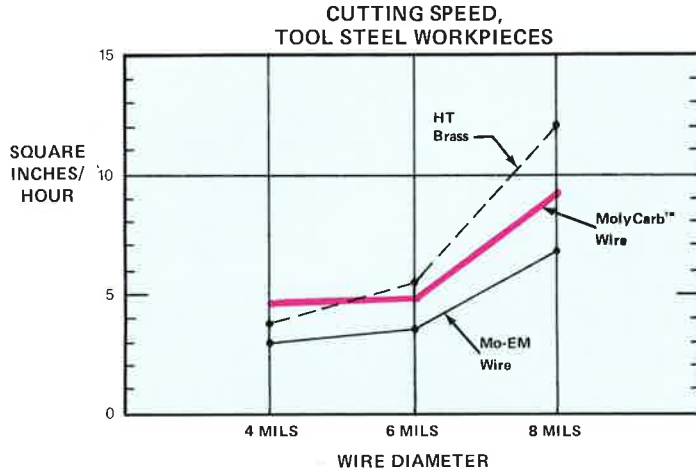


Excellent surface finish is one of the notable features of workpieces machined by GE's MolyCarb™ cutting wire.

CUTTING SPEED

From a production standpoint, the superior cutting speeds attainable with MolyCarb™ cutting wire rank as its most outstanding benefit.

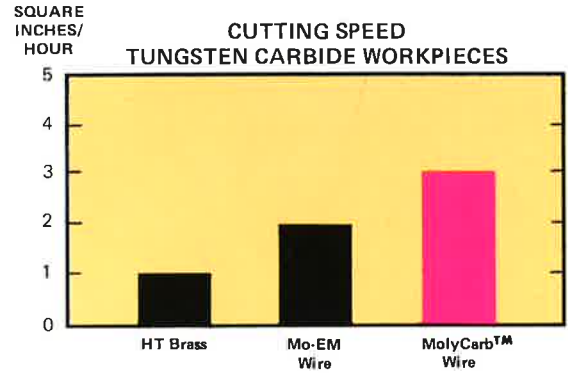
In comparisons using tool steel as the workpiece, MolyCarb™ wire cut at speeds 30 to 40% faster than conventional molybdenum wire in the 4 to 8 mil diameter range. In the smaller diameters, MolyCarb™ wire exceeded the speeds attainable with high speed brass. The chart below shows results of laboratory tests on a 1" thick D-2 tool steel work-



piece using plain molybdenum cutting wire, MolyCarb™ wire, and high tensile brass. In tests on thicker workpieces, up to 4 inches, MolyCarb™ wire maintained greater than 90% of its cutting speed.

Tests conducted on a 1.2 inch thick workpiece of fine grained tungsten carbide showed even greater cutting speed superiority for MolyCarb™ EDM wire. Cutting speeds were 58% faster than with conventional molybdenum wire, and three times faster than high tensile brass.

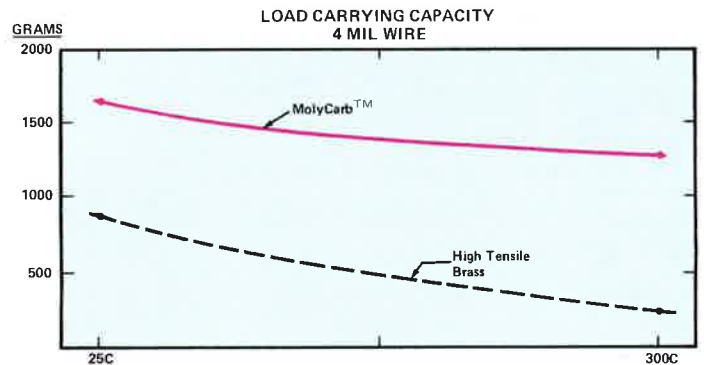
Photomicrographic examination of the workpiece indicated very little surface damage and no cobalt depletion using MolyCarb™ wire at these high cutting speeds.



TENSILE STRENGTH

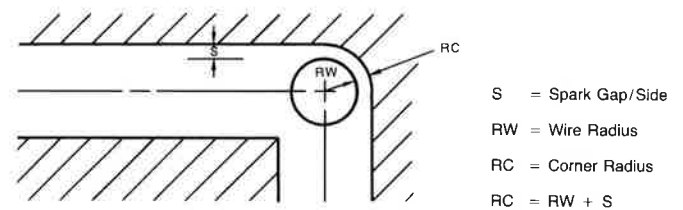
The high tensile strength of the molybdenum core material, and the fact that its strength does not drop off significantly in elevated temperatures, gives MolyCarb™ cutting wire excellent load carrying capacity in small diameter wires.

Wire Type	Ultimate Tensile Strength (psi)	Load Carrying Capacity In Grams At Indicated Wire Diameter					
		0.05mm 2 Mils	0.10 4	0.15 6	0.20 8	0.25 10	
25°C	MolyCarb™	280,000	400	1,600	3,600	6,400	10,000
	Brass HT	150,000	215	855	1,905	3,420	5,350
	Brass	57,000	80	325	730	1,300	2,030
300°C	MolyCarb™	222,000	315	1,265	2,850	5,060	7,910
	Brass HT	43,700	60	250	560	1,000	1,560
	Brass	27,400	40	155	350	625	975
500°C	MolyCarb™	195,000	230	1,110	2,500	4,445	6,950
	Brass HT	8,000	11	45	105	180	285
	Brass	7,600	10	40	100	175	270



CORNER RADII

MolyCarb™ wire is ideal for cutting corner radii with small diameter wire – 0.006" (0.152mm) diameter or less. Lower tensile materials, such as brass or copper, often experience excessive breakage in these applications.



Generally, the smallest internal corner that can be cut is equal to the wire radius plus the spark gap. When machining tall workpieces, the tension levels required are often beyond the strength limits of brass and copper wire, yet well within the capabilities of molybdenum wire.

Availability


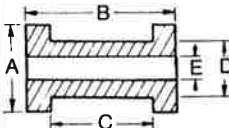


GE's MolyCarb™ molybdenum wire is available in diameters from 2 mil through 6 mil in one mil increments. Standard tolerances are ±2% by diameter. Other diameters and tolerances are available on special orders. Standard containers include nonconductive Lexan® polycarbonate resin 4K reel or mandrel spool, and the 1S plastic spool.

Specified quantities per container are available upon request. MolyCarb™ wire can also be specially wound on containers supplied by the customer.



MolyCarb™ EDM wire is available on various sized spools and reels depending on the quantity of wire required or the EDM equipment being used. Packages are individually sealed to protect them from damage, oxidation or corrosion.

Container Options

	Name	Material	GE Drawing No.	Approx. Weight In Grams	CONTAINER DIMENSIONS					Designation of Container Dimensions	
					Units	Flange Diameter (A)	Width (B)	Traverse (C)	Barrel (D)		Hole (E)
	Mandrel Spool	Lexan® polycarbonate resin	601-C-415	188	mm	82.55	57.15	41.25	49.48	25.48	
					in.	3.250	2.250	1.624	1.948	1.003	
	4K Reel	Lexan® polycarbonate resin	601-C-358	774	mm	152.40	96.82	76.20	110.62	15.90	
					in.	6.00	3.812	3.00	4.355	0.626	
	1S Spool	Plastic	601-B-1224	75	mm	63.50	85.73	76.20	44.45	15.88	
					in.	2.50	3.375	3.00	1.75	0.625	

*Lexan is a registered trademark of General Electric Company.

Maximum Container Loadings

Wire Diameter		Meters			Grams		
Mils	mm	Mandrel Spool	4K Reel	1S Spool	Mandrel Spool	4K Reel	1S Spool
2	0.051	20,000	N/A	25,000	500	N/A	600
3	0.076	10,000	40,000	12,000	500	1,850	600
4	0.102	6,000	30,000	7,200	500	2,500	600
5	0.127	3,700	20,000	4,500	500	2,600	600
6	0.152	3,000	15,000	3,200	500	2,800	600
7	0.178	2,000	11,000	2,300	500	2,800	600
8	0.203	1,500	8,500	1,800	500	2,800	600
9	0.229	1,200	6,500	1,400	500	2,800	600
10	0.254	1,000	5,500	1,100	500	2,800	600

Technical Assistance

General Electric Company has the facilities and experience to respond to your questions about molybdenum EDM cutting wires. Send your specifications and requirements to the Manager, Application Engineering, Glass & Metallurgical Products Marketing & Sales Operation, General Electric Company, 24400 Highland Road, Richmond Heights, Ohio 44143, (216) 266-6319.

Ordering Information

To order MolyCarb™ EDM wire, contact your Lamp Components & Technical Products Division sales representative or:

Domestic

General Electric Company
Dover Wire Operation
200 West Broadway
Dover, OH 44622
Phone: (216) 343-8841
Ext. 224

International

General Electric Company
Components/Quartz Marketing & Sales Operation
24400 Highland Road
Richmond Heights, Ohio 44143 U.S.A.
Telex: 985569 (GECOLCS EUCD)
Phone: (216) 266-3295

GENERAL  ELE

EUROPE

G.E. Lighting
Components Marketing & Sales
Melton Raod
Leicester LE4 7PD England
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