

Terminology:

Abrading: A process of electrode making. An abrasive-charged epoxy-type model or pattern is made and mounted. While reciprocating in a preset circular pattern, it is forced into a graphite blank, effectively “crush-forming” the patterns shape into the graphite forming a finished electrode.

Barrel Effect: The term given to the condition caused by the wire vibrating or resonating within the cut. This usually occurs in the middle of the wire's cutting length. This vibration, along with potential secondary cutting will create a “cavity” in the middle of the workpiece giving it a barrel appearance.

Cobalt Depletion: The leaching of the cobalt matrix material that holds the tungsten particles in place. Caused by electrolysis, this typically occurs while cutting carbides using water as a dielectric. Cutting parts in oil our with carbide generator circuitry can alleviate this condition.

Heat Affected Zone: The area immediately below the recast layer that has been influenced by the heat from the EDM process. Its depth depends on material and the edming conditions.

Ionization Voltage: The voltage at which current begins to flow across the gap. Typically, higher than working voltage.

Omnidirectional: Referring to a finish having no grain or lay as in the EDM finish. The EDM finish is a random array of millions of tiny craters having no linear or circular orientation.



Cross-Wound Wire Spools, It's not a bad wire issue!

The odds of receiving a cross wound spool from the wire manufacture is extremely low. How about 1 spool per 6727.3 spools manufactured.

So, you get a cross wound spool, immediately we find most will blame the wire as bad. That's unfortunate as they miss the fact that, in most cases the cross-wound spool is the result of another issue. It was not cross wound from the manufacture but something in your operation made it cross wound. Jumping to conclusions only makes solving the problem much more difficult. If you end up with several cross-wound spools and they are from different lot numbers, the problem is in your operation, guaranteed.

Cross winds (Overwraps) caused by the machine: **Supply Spool Brake Issues;** The spool arbor has some type of mechanism to provide drag on the spool. As the machine runs the spool develops momentum similar to a flywheel. If the drag is not sufficient, when the machine stops the wire will unspool slightly. When the machine is started back up, you have a cross wound spool. **Machine Design Problems:** Older machines mount the spool vertically; your opponent here is gravity. A loose spool will allow the wire to fall over itself creating a cross wound spool.

Most common issues are caused by the operator: **Failure to secure the loose end of the wire under tension.** When the spool is removed from the machine it MUST be secured tightly to mitigate any loosening or unspooling of the wire while in storage. Failure to do this almost guarantees a bad spool on the next run. **Jarring / Dropping / Banging the spool:** EDM Wire is sensitive to impact along its axis. This impact can significantly move the coils so that they overlap. **Improper Wire Storage:** Wire should be stored HORIZONTALLY not standing up. Once you place the wire vertically, gravity take its opportunity at shifting the wire coils. This is something that takes a conscious effort to make sure it doesn't happen, it's so easy to set the spool on the flange and walk away.

Manufacturing Issues leading to cross wound spools: Most of issues are the result of incorrect setting of the winding machines traverse mechanism. The problem could be incorrect end of spool reversal setting or a traverse rate that is not consistent. This is easily determined by looking at the spool. In looking at how the wire approaches and lays at the flange end will provide the information needed. If the wire ramps up or ramps down at the flange, it is a bad spool. If the wire coils slide loosely when the spool is first opened, it is a bad spool. If you notice high spots on the wire coil surface, it is a bad spool.

Most wire is laser checked during winding which minimizes these issues. So that almost all wire issues are not caused by manufacturing defects.

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