

SuperArc® SuperGlide®

SUPERARC® & SUPERGLIDE® VS. THE COMPETITION

Lincoln	Competition
5	0

- 1 CHEMISTRY**
- 2 DIAMETER**
- 3 FEEDABILITY**
- 4 ARC PERFORMANCE**
- 5 SALES & SERVICE**

When you manufacture the world's best MIG wire, you can put it up against any opponent in the most rigorous competition. That's exactly what we did with SuperArc copper-coated and SuperGlide bare MIG wires by Lincoln Electric. Our customers have always known that these products set the benchmark in the industry – now rigorous testing shows the results. We put SuperArc and SuperGlide MIG wires in a contest vs. The Competition. Here's what happened.

We had a MIG Wire Pentathlon that included the following events: chemistry, diameter, feedability, arc performance, and product offering and support. To no surprise, SuperArc and SuperGlide MIG wires won the gold.



SuperArc® SuperGlide®

SUPERARC AND SUPERGLIDE MIG WIRE ELECTRODES

Manufactured by The Lincoln Electric Company.

Consistency in MIG wire chemical composition is a critical element for consistency in the weld deposit. This is why The Lincoln Electric Company goes to great lengths to assure our customers that what you expect is what you get with Lincoln MIG wire.

In the manufacturing process, Lincoln screens incoming raw material green rod steel twice on every 2,000 lbs. — analyzing up to 34 elements at both the beginning and end of each incoming raw material coil. Our competition relies on the steel mill certificate on each heat. That can typically be three samples the size of a coin from over 250,000 lbs. of steel.

We purchased spools of different alloys and diameters of competitive MIG wire and put them to the test. Our suspicions were proven to be true. Many of the samples did not comply to AWS A5.18 and ASME SFA 5.18 wire electrode composition requirements as listed in Table 1 — even though the samples were labeled as if they did comply. Is this a product you want to use when welding your products?

Let's take a closer look —



Table 1

AWS ER70S-6 WIRE ELECTRODE COMPOSITION REQUIREMENTS

WIRE TYPE	%C	%MN	%SI	%S	%P	%CU
ER70S-6	.06-.15	1.40-1.85	.80-1.15	.035 MAX	.025 MAX	.50 MAX

ACTUAL COMPETITIVE CHEMICAL COMPOSITION TESTING

Competitive Chemical Composition

The competition did not fare so well in this event. As shown in Figure 2, over half (58%) of the samples did not meet these requirements, although the labels on the product clearly stated that they were indeed ER70S-6!

How does inconsistent chemistry affect your day-to-day welding operation?

- Inconsistent chemistry = Inconsistent mechanical properties potentially affecting the service of the weld
- Inconsistent chemistry = Lower productivity
- Inconsistent chemistry = Higher operating costs

The bottom line is that inconsistent chemistry is inefficient and causes nothing but problems in your day to day operations.

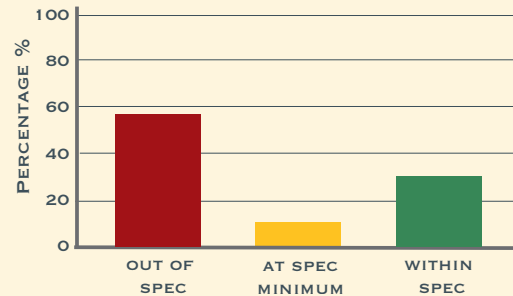
SuperArc and SuperGlide Chemical Composition

An equal number of random samples of ER70S-6 SuperArc, SuperGlide, and a competitive MIG wire were chosen. Optical emissions spectrometry was used to analyze the chemical composition of each individual MIG wire. To no surprise, all Lincoln Electric MIG wires fell well within the AWS requirements (see figure 3).

Off to round two of the pentathlon — the Diameter Competition. Let's check the results.

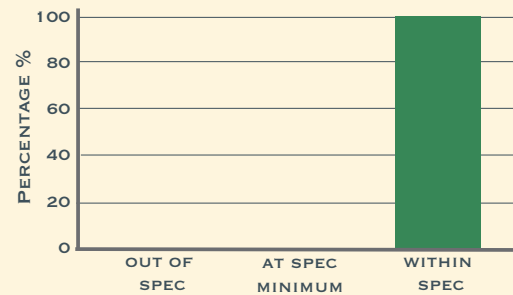
PERCENT SAMPLES WITHIN ER70S-6 PER AWS A5.18

Figure 2* Competitive Chemical Composition



*58% of the typical samples did not meet the minimum of the AWS spec.

Figure 3** SuperArc & SuperGlide Chemical Composition



**100% of SuperArc & SuperGlide typical samples fall within the AWS spec.

Round One Score:	
Lincoln	Competition
1	0

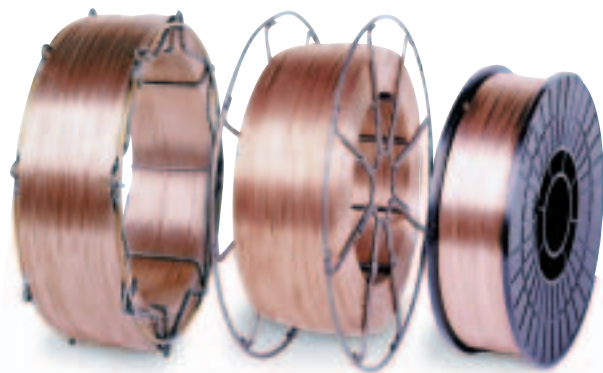
CHEMISTRY

SuperArc® SuperGlide®

SUPERARC AND SUPERGLIDE MIG WIRE ELECTRODES

Manufactured by The Lincoln Electric Company.

In this round of the competition, we again looked at the same 24 competitive samples and the same 24 SuperArc and SuperGlide samples. The goal was to be compliant to AWS diameter standards of $\pm .001$ " on .035" and .045" wire diameter as required by AWS A5.18 and by ASME SFA 5.18.



ACTUAL COMPETITIVE ELECTRODE DIAMETER TESTING

Competitive Electrode Diameter

The competition's performance was fair at best. An astonishing 46% of these samples did not fall within these required ranges. Figure 4 depicts these results. In fact, some wires were larger in diameter than allowable and some were smaller. The competition doesn't seem to care much about the consistency of their wire diameter either.

How does inconsistent diameter affect your day-to-day welding operation?

- Inconsistent diameter = Inconsistent welds
- Inconsistent diameter = The need for repetitive procedural adjustment within a spool or from spool to spool
- Inconsistent diameter = Potential feeding problems
- Inconsistent diameter = Lower productivity and increased downtime associated with troubleshooting and contact tip wear
- Inconsistent diameter = Higher operating costs

The bottom line is that inconsistent wire diameter is inefficient and causes nothing but problems in your day-to-day operations.

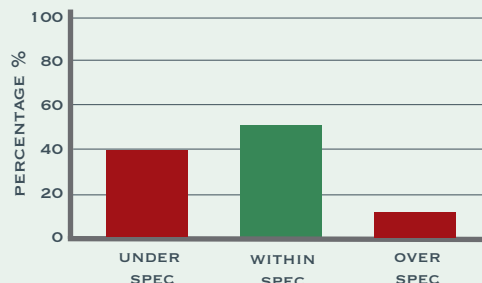
SuperArc & SuperGlide Diameter

The performance of SuperArc and SuperGlide MIG wires was outstanding. All 24 samples, 100%, fell well within the AWS allowable range for wire diameter as shown in Figure 5. We can ensure consistent diameter due to our manufacturing process. Every bulk package production line of SuperArc and SuperGlide MIG wire is electronically monitored for wire diameter. If the diameter falls outside our specification, the line shuts down and corrective action is taken. Finished product is also periodically tested for wire diameter so that we can provide our customers with extremely consistent material time and time again.

Off to round three of the pentathlon, — the Feedability Competition. Let's check the results.

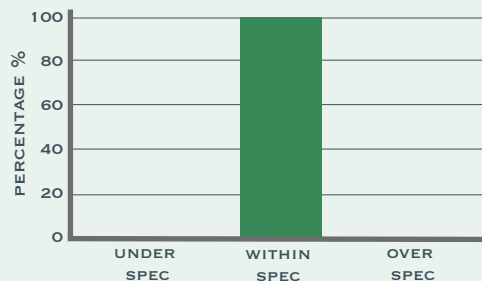
PERCENT SAMPLES WITHIN ER70S-6 PER AWS A5.18

Figure 4* Competitive Electrode Diameter



*46% of the random samples did not meet AWS diameter specs.

Figure 5** SuperArc & SuperGlide Electrode Diameter



**100% of the SuperArc & SuperGlide typical samples fall within AWS diameter specs.

DIAMETER

Round Two Score:	
Lincoln	Competition
2	0

SuperArc® SuperGlide®

SUPERARC AND SUPERGLIDE MIG WIRE ELECTRODES

Manufactured by The Lincoln Electric Company.

The goal of this round is to test each wire's ability to deliver consistent, trouble-free feedability. Here, feed force while welding was measured over a five-minute interval for both SuperArc and the Competitive MIG wire.

Here's how each fared —



ACTUAL COMPETITIVE ELECTRODE FEEDABILITY TESTING

Competitive Wire Feed Force

Figure 6 shows how the Competition performed in this event. The graph depicts a typical feed test in which the force required to feed increased as the test progressed. In fact, testing was shut down at 3.5 minutes due to excessive force which caused wire burnback into the contact tip. The test was repeated — with similar results.

How does inconsistent feedability affect your day-to-day welding operation?

- Poor feedability = Gun chatter causing operator discomfort
- Poor feedability = Reduced life of gun consumables
- Poor feedability = Arc start failures and/or burnback into the contact tip
- Poor feedability = Wavy welds due to inconsistent wire feeding.
- Poor feedability = Lower productivity
- Poor feedability = Higher operating costs

The bottom line is that inconsistent feedability is inefficient and causes nothing but problems in your day to day operations.

SuperArc & SuperGlide Wire Feed Force

The MicroGuard™ Ultra Advantage 

Figure 7 shows the results of the SuperArc MIG wire. As shown by the flat output curve, feed force was consistent throughout the cycle. The low feed force is also an excellent indication that the wire will feed without drag in the welding gun and cable assembly. Operator comfort will be high due to lack of gun chatter and vibration caused by poor feeding wires.

This is obtained through a proprietary manufacturing process in which MicroGuard Ultra™ surface treatment is added to SuperArc and SuperGlide MIG wires. MicroGuard™ Ultra lubrication is applied to the surface of the finished MIG wire. It adheres in a precise, uniform fashion to deliver superior wire feeding. In addition, once the welding arc is established, MicroGuard™ Ultra surface treatment is activated to produce superior and stable welding performance.

Off to round four of the pentathlon — Arc Performance. Let's check the results.

Figure 6 Competitive Wire Feed Force

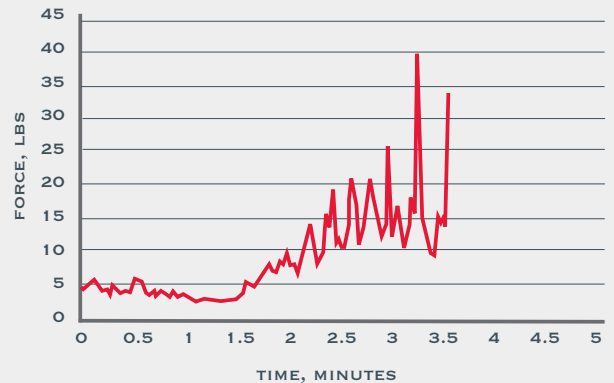
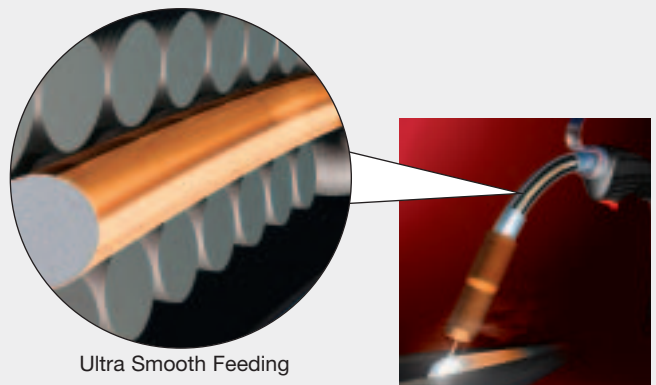
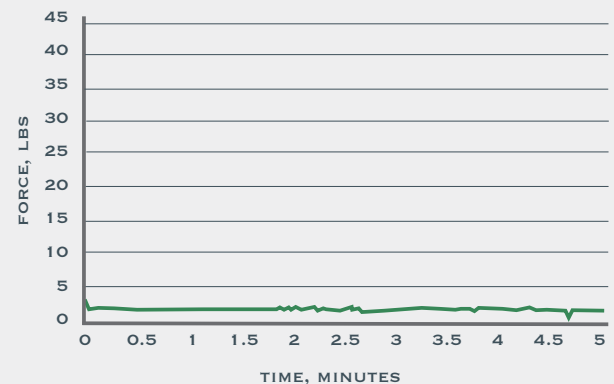


Figure 7 SuperArc & SuperGlide Wire Feed Force



Round Three Score:	
Lincoln	Competition
3	0

FEEDABILITY

SuperArc® SuperGlide®

SUPERARC AND SUPERGLIDE MIG WIRE ELECTRODES

Manufactured by The Lincoln Electric Company.

In this event, both wires were subject to an arc performance test to determine the transition voltage between spray and a globular or short arc transfer. The test was then repeated to determine consistency of this transition voltage, and therefore, consistency of the arc performance of the MIG wire.



Lincoln MIG Wire



Competitive MIG Wire

ACTUAL COMPETITIVE ELECTRODE ARC PERFORMANCE TESTING

Competitive Electrode Arc Performance

As shown in Figure 8, the Competition has a variance of 1.5 volts in transition voltage from one test to the next, within the same spool of wire. Most fabricators cannot afford to have this variation and cannot afford to continually set and reset welding parameters.

How does inconsistent arc characteristics affect your day-to-day welding operation?

- Inconsistent arc = Inconsistent welds
- Inconsistent arc = The need for repetitive procedural adjustment within a spool or from spool to spool.
- Inconsistent arc = Arc start failures and/or burnback into the contact tip
- Inconsistent arc = Lower productivity, increased downtime.
- Inconsistent arc = Higher operating costs

The bottom line is that inconsistent arc characteristics are inefficient and cause nothing but problems in your day to day operations.

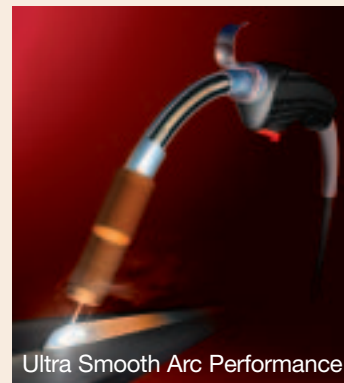
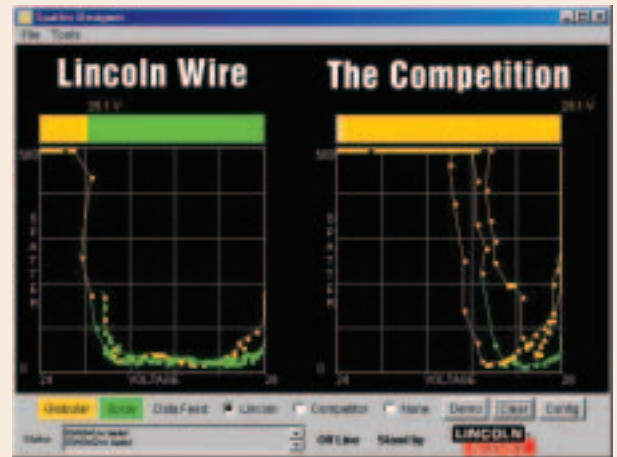
SuperArc & SuperGlide Arc Performance



As you can see in Figure 8 the transition voltage for SuperArc MIG wire is consistently lower than the Competition, and the operating range, as shown in green, is far wider than the Competition. This offers many advantages. The advantage of a lower transition voltage is the ability to spray arc at lower procedure settings, and therefore, better weld puddle control and less chance for undercut or scalloped bead edges. The advantage of the broader operating range is that the operator can find his individual "sweet spot" voltage and not be tied down to a specific single value.

ARC PERFORMANCE TEST RESULTS

Figure 8 Results of Multiple Transition Voltage Tests



Ultra Smooth Arc Performance

Also note the consistency of performance from one test to the next. These results are due to MicroGuard™ Ultra technology surface treatment, which is activated as an arc enhancement agent during welding for lower spatter levels and a more stable arc than wires without this technology. Microguard™ Ultra arc enhancement

agents are just one more reason why Lincoln outperforms the Competition.

Once again the results are clear. SuperArc and SuperGlide MIG wire clearly beats the Competition.

Off to round five of the pentathlon — Sales & Service. Let's check the results.

Round Four Score:	
Lincoln	Competition
4	0

**SUPERARC AND SUPERGLIDE
MIG WIRE ELECTRODES**

Manufactured by The Lincoln Electric Company.

SuperArc and SuperGlide MIG wires by Lincoln Electric are available in a wide spectrum of diameters, alloys and packaging, so that there's almost always a premium MIG wire perfect for your job. Lincoln Electric offers you a 2 lb. spool for spool guns and small, wire feed welders, up through 1000 lb. Accu-Trak packages, and most every package in between.

Accu-Trak™ twist-free wiring technology assures accurate wire placement in the weld joint and is designed to eliminate wire flip in the feeding system. Accu-Trak™ is especially recommended for robotic and automatic welding, as well as a variety of other applications.

SuperArc and SuperGlide MIG wire is also offered in state-of-the-art patented packages including the Accu-Pak box, a completely recyclable package designed to reduce handling issues as well as disposal issues.

All of these products are offered in a full range of wire diameters and alloys, as Lincoln Electric manufactures ER70S-3, ER70S-4 and ER70S-6 as well as low alloy GMAW products.

SuperArc® SuperGlide®



Accu-Pak boxes - ease of mobility

SALES AND SERVICE

Competitive Sales & Support

Where is your current MIG wire supplier located? The Competition, in this case, is located outside the United States with no local company sales staff, no R&D Department, no application nor manufacturing engineers and no one that can be easily consulted for questions, support or solutions.

Lincoln Sales & Support

There's a lot to be said about single source supply, especially when your partner is as technically astute and knowledgeable as The Lincoln Electric Company. At Lincoln Electric's corporate headquarters in Cleveland, Ohio, we are staffed with an excellent MIG wire support team. R&D engineers work constantly to improve SuperArc and SuperGlide, and application engineers help customers every day with their welding needs. For local support, we have over 25 district sales offices staffed with trained sales engineers to support you on the local level.

Once again, SuperArc and SuperGlide outperform the Competition.



Lincoln Guarantee

When you make the world's best MIG wire, you can offer the world's best guarantee, and that's what Lincoln Electric has to offer for SuperArc and SuperGlide MIG wires. The MIGuarantee is a no-fault, no questions asked guarantee that SuperArc and SuperGlide MIG wires will meet or exceed your expectations or we will immediately send replacement product to keep you up and running. With our network of distribution centers throughout the U.S., we can ensure you that your replacement product will arrive in a very timely manner. The Competition can not say the same.

Final Score:	
Lincoln	Competition
5	0

For the industry's benchmark on MIG wire performance, product offering, and service before, during and after the sale, buy SuperArc and SuperGlide MIG wires. Choose these gold medal winners in our multi-dimensional pentathlon. Go with a winner – go with SuperArc and SuperGlide!

SALES & SERVICE