



FINDING OPPORTUNITY IN THE EV MARKET.

BE READY WITH PRECISION GRINDING.

The electric vehicle (EV) revolution is happening now. With plug-in hybrids and fully electric vehicles, every major automaker is beginning the transition to EV—with some like Ford planning to be carbon-neutral within the next 30 years—and EV makers are proliferating.

Many precision grinding specialists see the EV revolution as a death knell for their automotive business. With more suppliers vying for increasingly fewer ground internal combustion engine (ICE) parts, many manufacturers fear for their businesses. Precision grinding shops aren't in imminent danger of losing their automotive business; a recent report from Bank of America Global Research suggests that five to ten model years likely remain for ICE car dominance, giving the grinding industry time to adapt and change to add EV parts to their offerings.

Rather than approaching the future with fear, precision automotive shops would do well to recognize an exciting truth: the market shift to EV presents a significant opportunity to the precision grinding shop. Simply put, there will be an overwhelming amount of new business to win. With the flexibility of the right machine and software, precision grinding shops will be ready to meet the changing automotive market—and bring in revenue while they're at it.





PARTS ARE STILL PARTS.

Traditional vehicles have many ground components, especially in the internal combustion engine. Because EVs don't have an ICE motor, many manufacturers assume that there are no precision ground parts in EVs. But this is a misconception.

Many components are the same between traditional and electric vehicles. While EVs don't have transmissions or fuel injectors, all cars have ground parts like a steering column, including ball screws and ball nuts, a motor or axle shaft, bearings and spindle shafts. Some turned or welded parts, like suspensions, also remain the same between ICE vehicles and EVs.

The most significant difference between ICE and EV parts comes down to sound. Internal combustion engine noise often masks the discrepancies or impurities of other parts. But noisy, imperfect parts are unacceptable in characteristically quiet EVs. And quietude comes down to tight tolerances.

Believe it or not, tolerances of EV parts have more in common with ground parts in medical or aerospace applications than with ICE parts. EV parts require super-tight tolerances that eliminate imperfections and their associated noises. A shop's ability to produce these tighter-tolerance parts will help secure their market share in a more exacting automotive market.

MEETING THE EV DEMAND

Traditional transmission shafts and gears could traditionally be produced on a lower-end grinding machines and still be acceptable for production. But there is only so much tolerance and surface finish potential these machines can achieve. What steps can the grinding industry take to stay agile and ready to meet the changing automotive market? The current capabilities needed for ICE parts can be shifted to produce the parts of an electric motor. It's a matter of being equipped with the advanced grinding technologies necessary to produce of precision parts for this—or any other—segment. Take STUDER cylindrical grinding machines, for example. Their impressive changeover speed lets a versatile business serve not only the automotive market, but new opportunities in other segments as well.



«When the EV revolution took firm hold, the **STUDER S36** production grinding machine was introduced.»



Tier suppliers to North American OEMs are no strangers to adapting their product mixes and materials in previous moves towards automotive energy efficiency. Just look at fuel injector nozzles, which saw a decades-long tolerance improvement to satisfy unrelenting fuel efficiency demands. When automotive manufacturers needed even more efficiency out of their optimized engines, turbochargers were introduced to squeeze more power from smaller ICES. Turbocharger wheel shafts are long and thin, and spin at incredibly high RPMs, which requires increased precision along the entire wheel shaft. This increased precision requires grinding machines that can hold micron-range tolerances along the entire dimension of the workpiece.

CYLINDRICAL GRINDING: READY FOR AN EV FUTURE

Grinding businesses must evaluate whether their processes are designed to keep pace with market dynamics. Cylindrical grinding operations replaced lathe-turning operations in many companies as ultra-precise form and finish tolerances in smaller pieces increasingly became the norm. STUDER introduced the world's first CNC controlled cylindrical grinder in 1977, and with their deep expertise in this specialized area, evolved into not simply a machine tool OEM but also a leading provider of innovative approaches to production efficiency.

When the EV revolution took firm hold, the STUDER S36 production grinding machine was introduced. It boasted features specifically designed to accommodate EV production, including the ability to accommodate large grinding wheels (up to 600mm in diameter and 125mm in width) and the ability to order the machine with a grinding wheel angle of 0, 15 or 30 degrees.

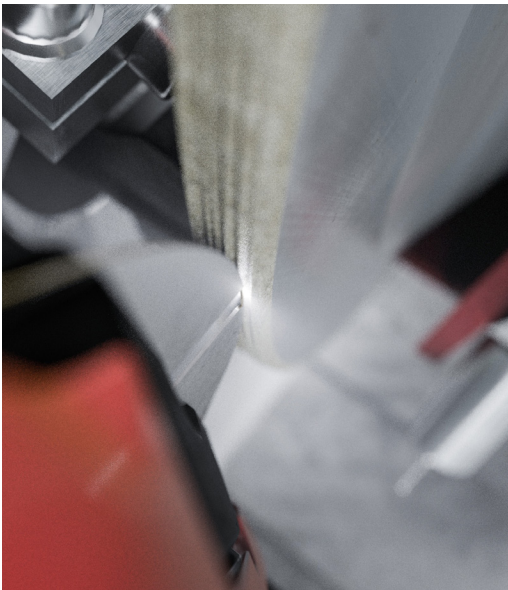
Another example: modular cylindrical grinding machines that integrate multiple functions into one operation on one piece of equipment instead of one for each. STUDER ID/OD grinders can hold multiple wheels with various combinations of ID and OD spindles, which combine to allow a single setup for many complex processes and the most difficult materials.

This leaner approach dramatically reduces cycle times and limits changeovers, while offering the utmost in flexibility to work with very complex and new-to-the-world applications. Cylindrical grinding machines exist today with integrated EDM wheel dressing technology enabling shops to dress their own diamond and metal-bond wheels in process and at full speed right on the machine, delivering optimized cycle times, longer wheel life, and increased performance. Conditioning the machine wheel for any type of abrasive creates a degree of flexibility previously unheard of.

But machine upgrades are only part of the equation. Investing in software to embody the machines with technology know-how is increasingly a necessity, not a luxury. Fortunately, a brain trust of engineers at UNITED GRINDING and STUDER had the vision which has given their cylindrical grinding machines the functionality to make precision parts quickly and a flexibility in tackling new applications that is beyond all imagining.

Software innovations such as StuderSIM and StuderWIN have paved the way for machine operators with little experience to achieve extraordinary tolerances that previously required decades of experience to realize. It's an incredible productivity hack that drastically shortens the skills gap.

The latest innovation from UNITED GRINDING is the new C.O.R.E. operating system, which uses an all-new intuitive machine control to deliver the most user-friendly human-machine interface on the market. Speedier production, adaptability for a lean workforce and a realization of greater machine connectivity.



THE TIME TO ADAPT IS NOW

A high-precision manufacturer has nothing to lose and everything to gain by eliminating the need to handle parts during production. This drives higher quality with repeatable precision and efficiency, with fewer machine setup changes and transfers of parts. A STUDER ID/OD grinding machine equipped with a flexLoad robot performs over 90% of the necessary labor per shift, for example.

New automation innovations from UNITED GRINDING North America, such as the new versaLoad™ automation cell, deliver maximum versatility to job shops with high-mix, low-volume production runs. All of this is at a price point that makes it well within reach of even the smallest job shops.

UNITED GRINDING North America can help support Tier suppliers, automotive production job shops and OEMs through the EV transition process as production requirements keep evolving. Whether producing precise small parts in large series or small batches, the EV revolution has started, and now's the time to begin the transition. Here are a few suggestions to get you on your way:

- Contact the grinding experts at UNITED GRINDING for an evaluation of your shop's EV preparedness, especially the tolerances of your machines.
- Prepare your employees for change by offering additional skills training. UNITED GRINDING has partnered with TITANS of CNC Academy to offer such training.
- Learn more about automation add-ons—like collaborative robots—that could improve your production speed and flexibility.
- Calculate the ROI of more capable precision grinding software, like UNITED GRINDING's C.O.R.E.

Change is daunting, and it doesn't happen overnight. But if you take the first steps now, you will position your organization for remarkable success in a quickly-changing—and opportunity-rich—automotive industry.

You're not alone in this process. Talk to the experts at UNITED GRINDING any time.

TALK TO UNITED GRINDING

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