



MAKING EASY AUTOMOTIVE DIAGNOSTICS POSSIBLE

Manufacturing an automotive-quality electrical connector quickly without major capital expenditures

TE Connectivity needed to make an automotive part quickly, in relatively small volumes using automotive-approved materials.

A major American automaker approached TE Connectivity with a challenge. They needed a connector for a fast-feedback diagnostic module meant to be used in several hundred cars at a time. In these small volumes, neither the automaker nor TE Connectivity could justify injection mold tooling costs, which might approach \$100,000 for this part.

Moreover, the connector needed to be made with a durable, rigid, serial-grade plastic that could withstand real-world conditions and eventually pass an automotive part production approval process (PPAP). TE Connectivity knew how to design the optimal connector for their customer, but they needed a manufacturing partner who could produce a part that met their specifications.

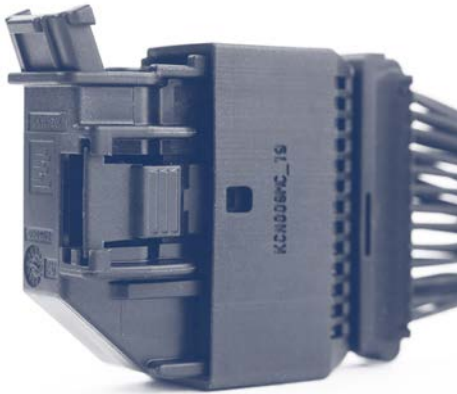
Together, Carbon and Fast Radius made TE Connectivity's vision a reality. With its ability to create durable parts using automotive-quality materials, the Carbon DLS™ process was the ideal way to make the connector. Fast Radius' scalable DLS production capacity and extensive experience making end-use parts for the automotive industry allowed TE Connectivity to move into production quickly and efficiently

MAKING IT POSSIBLE

Durable material and scalable production

AUTOMOTIVE-CERTIFIED MATERIALS

TE Connectivity chose to make the connector with Carbon EPX 82 because of its rigidity, strength, and temperature resistance. Used extensively in the auto industry, EPX 82 has gone through USCAR testing, heat age cycling, fluid resistance tests, and has been approved for other serial automotive production parts. TE Connectivity was confident that EPX 82 would meet their customer's stringent requirements.



DESIGN FREEDOM

TE Connectivity leveraged a couple key benefits of additive manufacturing in their design for the electrical connector. They serialized each part with a unique, digitally applied number, allowing each part to be fully traced through the supply chain. Printing the serial number directly on the part saves time since serial numbers typically have to be added after a part is molded or casted. TE Connectivity also simplified and improved the product design by incorporating performance features that could only be achieved with the DLS process.

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RAPID ITERATION

TE Connectivity went through three rounds of iterations in just a few weeks before landing on the optimal design for the connector. With each round, Fast Radius produced new production-grade parts in a matter of days, rather than the weeks or months a similar revision would take with molding. Plus, each minor design alteration didn't cost anything, whereas a new tool would cost thousands or even tens of thousands to alter. TE Connectivity's customer was able to test these parts in the field much sooner than would be possible in a traditional product development cycle because the connectors are made with the same material and process as the end-use parts.

SCALABLE PRODUCTION CAPACITY

TE Connectivity's customer initially needs a few thousand electrical connectors made. This isn't enough to justify the capital expenditure of an injection molding tool, but it's more than a prototyping shop can handle. Fast Radius has a certified automotive-grade quality system and the manufacturing infrastructure required to make end-use production parts in any quantity. This allows TE Connectivity to scale production as their customer's needs evolve. If demand for the product grows to the point where injection molding makes economic sense, Fast Radius can manage the entire bridge to tooling process as well.

THE RESULTS

A collaboration that makes automotive-quality parts faster, better, and less expensive.



Galen Martin,
Senior Principal Design
Engineer, TE Connectivity

“The working relationship between our companies has made the program a success. Together, Fast Radius and Carbon were able to anticipate and solve all the design and manufacturing challenges that got in our way. The result is an auto-quality part that we can produce at scale.”



\$100,000

ESTIMATED SAVINGS
IN INJECTION MOLDING
TOOLING

ISO9001

CERTIFIED QUALITY
MANAGEMENT

WEEKS

FROM CONCEPT TO
PRODUCTION, RATHER
THAN MONTHS