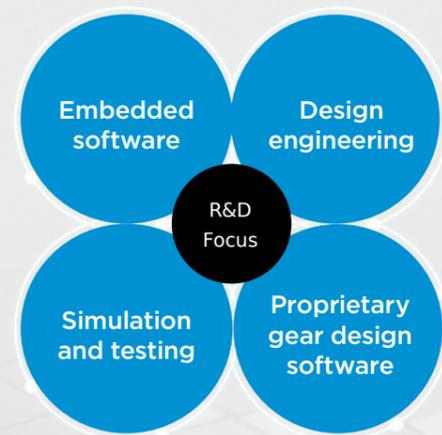


TECHNOLOGY AND R&D FOCUS

Gaining an edge with technological know-how

We invest in growing and refining our R&D capability to ensure that we have the requisite strengths to stay ahead of the competition. Our R&D investments are significantly higher in comparison to industry standards.



“Our technology-driven approach and a particular focus on R&D is what differentiates us from our peers.”

Kiran Manohar Deshmukh, Group CTO

Ready for the Electric Revolution

Driveline division

In the driveline division, our main product is differential bevel gears. We were the first company in India to manufacture gears using the precision forming process. Our material yield is much higher than the gears manufactured using traditional methods because we form the gear teeth and do not cut them from a blank. The internal grain flow of formed gears is aligned with the tooth profile, making these teeth far superior to the teeth of machined gears.

We have developed an in-house proprietary gear design software that helps us create gear tooth profiles optimised for specific customer needs. Our over two decades of experience has resulted in several improvements spanning the processes of forging, machining, heat treatment, and surface treatment.

It is not surprising that the differential gears of electric cars must be much stronger, more precise, and power-denser than those used in ICE vehicles. The electric motors of EVs are typically mounted on the axle, and the entire power of the motor is immediately available to the differential gears. Unlike ICE vehicles, the electric motor can attain its full torque at almost zero speed. Electric cars are inherently silent, so they demand high NVH characteristics from the components of their drivetrains. In the quest to increase the range of electric vehicles, car makers are always looking for ways to reduce the weight of the parts without adversely affecting their performance.

Thanks to our precision forming technology, we can provide to our electric vehicle OEMs the differential drive units that are:

- Stronger and more durable,
- Quieter, and
- Lighter in weight.

Electric division

We are primarily engaged in the manufacturing of starter motors for light, passenger, and commercial vehicles. We share long-standing relationships with some of the leading OEMs that have manufacturing plants and consumers worldwide. Our high-performance starter motors withstand extreme temperature conditions experienced in Europe and North America.

Given the recent shift towards the electrification of drivetrain, we have focused our R&D efforts towards developing drive motors and controllers for different types of hybrid and electric vehicles. A significant component of these efforts has been in developing the hardware and software for the controllers. We have invested heavily in enabling algorithms, cybersecurity, On-Board Diagnostics, Over-The-Air updates, and other capabilities.

~126%

INCREASE IN R&D EXPENDITURE IN FY 2020-21 COMPARED TO THE PREVIOUS YEAR (INCLUDING COMSTAR)

INITIATIVES FY 2020-21

Product introductions

- Drive motors for two-wheelers and three-wheelers
- Controllers for EVs and Hybrids
- Belt-driven Starter Generator (BSG) for hybrid cars

Manufacturing Processes

- Focused on digitising our operations through the Industry 4.0 Initiative
- Incorporated SAP across our plants in Gurugram and Manesar, gaining access to real-time data and leading to substantial reduction in breakdowns
- Implemented AI-based visual inspection of gears, resulting in the elimination of human errors in assessment and reduction of human resources
- Introduced Machine Learning techniques for optimising the heat treatment process control based on the raw material properties
- Established various analytical tools that enhanced efficiencies across all business verticals