

# MECHANICAL ENGINEERING

## Very high speed electrospindles on air bearings

<b>Funded By</b>	Ministero dell'Università e della Ricerca - MUR [P.iva/CF:96446770586] CARBOMECH SRL [P.iva/CF:11380580016]
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<b>Context of the research activity</b>	Bearings with oil free characteristics are particularly appreciated in some applications due to the total absence of lubricating oil. In industry, signs of support for eco-sustainable solutions are increasingly frequent. The technology of air bearings is one of these, as it combines the demands of eco-compatibility of the components with the technical requirements of being able to operate at very high rotation speeds.
<b>Objectives</b>	There is a growing demand for electrospindles for very high-speed precision machine tools to create complex miniaturized devices and systems in consumer markets such as medical devices, electronics and communications. Major drive technologies enabling spindle rotational speeds in the range of 100,000 -200,000 rpm include electric motors, both AC and DC, and air bearings. The air bearings, intrinsically non-polluting, have considerable advantages in terms of simplicity of construction, reduced overall dimensions and reduced thermal dissipation. However, these bearings have problems related to whirling instability and run-out. To overcome or limit these drawbacks, it is necessary to carry out accurate theoretical and experimental studies aimed at identifying the best solutions both in terms of electric motors and in terms of gas bearings. With this doctorate the above problems will be addressed
<b>Skills and competencies for the development of the activity</b>	The candidate must be a mechanical, aerospace or electrical engineer and must have a predisposition to carry out both theoretical and experimental studies.