

## Documents

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**Three-segment electrodiffusion probes for wall shear rate measurements**

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**Abstract**

Electrodiffusion (ED) probes, flush-mounted into a wall, present a unique method for wall shear rate measurements. This method is based on the measurement of the limiting diffusion current. It is a non-invasive technique reflecting the phenomena at the wall, which cannot be captured by another technique. Wall shear rate is calculated from the measured current. Using three-segment probes, the components of wall shear rate can be measured. The underlying theory and new practical formulas for evaluation of wall shear rate and its components from measured segment currents are described. The use of three-segment and simple ED probes is documented using Taylor-Couette-Poiseuille flow. Three types of flow are studied: the Taylor vortices, helix winding in the same direction as the base flow (right spiral) and helix winding in the opposite direction (left spiral). The distributions of tangential and axial components of shear rate obtained by a three-segment probe at the wall of the outer steady cylinder are complemented by the photos of flow structures. © 2018, Research Trend. All rights reserved.

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