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Measurement of Axial Torque Profiles along Inner Wall of Screw Hole In-Zone Heating Barrel during Plasticating Process - Influence of Plasticating Conditions and Screw Configurations –

*S. Xu (a), H. Yokoi (b)**(a) Sanjo Seiki Co., Ltd., xu_shizhong@sanjo.co.jp**(b) Center for Collaborative Research, The University of Tokyo
4-6-1, Komaba, Meguro-ku, Tokyo 153-8904, Japan*

We developed a torque measuring ring which can directly be installed in a heating barrel of injection molding machines. It has a double ring structure consisting of outer and inner narrow barrels, which are connected by four confronting beams in-zone. The torque loaded from the rotating screw and plasticating resin can be measured by the strain gauges adhered on the beams.

In this study, we installed three sets of measuring rings simultaneously into the heating barrel to measure the torque profiles under different screw rotational speeds and different screw configurations using polypropylene (PP). The experiments revealed an interesting phenomenon where there appear two peaks of torque axial profiles irrespective of the plasticating conditions; at the interference area between the solid-beds and screw surface in the compression zone, and at the start of melting in the feed zone. This paper introduces details of the experimental method, and some typical measuring data indicating the above-mentioned phenomenon. This torque monitoring system is also very effective for evaluating the performance of each screw configuration.