



Application flyer

Determination of the properties on deep-drawn sheets

Special testing machine 20kN for draw-bead tests



Application:

This special testing machine allows to determine the abrasion and friction properties on deep-drawn sheets in automotive manufacturing. Those sheets are used e.g. for engine bonnets, car wings, doors or pillars. The corresponding test procedure is the draw-bead test. As the sheets are irregularly shaped, the forming procedures are complicated.

In order to control the material flow in a manner that the sheet does not crinkle or even burst, so-called draw beads are incorporated in the drawing blades of the forming die. They act like brakes and help to prevent material flows into the drawing form. These draw beads are the neuralgic points during the drawing process. They fulfill their function only if there are optimal friction conditions between them and the sheet. The friction conditions are set up by anti-friction agents or the coating of the deep-drawing sheet steel during the manufacturing process. Galvanised sheet has anti-friction properties which are of great use for the drawing process. The measure for the friction conditions is the friction coefficient. In order to choose the right anti-friction agent or rather the right coating for a special type of sheet, this friction coefficient has to be determined. The corresponding test procedure is the draw bead test: a sheet specimen is drawn through a clamping device with draw bead at a defined force and speed.

The testing sheets can have up to 50mm width, 400mm length and a height of 2mm. The hydraulic clamping axis is horizontally, the pull-off axis is vertically arranged. Forces up to 50 kN are applied for contract pressure in order to pull the sheet through the clamping device at variable speed. The pull-off speed can be up to 150 mm/s. For this reason, the working chamber is enclosed from all sides and secured by electrically locked safety doors. Tests can only be run, when the safety doors are closed.

The clamping device for draw-bead tests can be easily exchanged with another device without draw-bead, which is supposed to carry out friction force tests. These tests work with an especially high contact pressure and maximum swipe speed. They serve to examine the durability of surface coatings, e.g. of zinc coating. This is of crucial importance, as the shaping process should not cause damages at the anti-corrosion protection.

Two thermocouples are available in addition to record the jaw temperatures during the test. A further extra offers the construction of the clamping jaws. They are equipped with ball-bearing support stop rollers to prevent curved samples, e.g. during friction force tests, from veering off course.