

RESUMO N° 407

CHARACTERIZATION OF HEAT TRANSFER COEFFICIENTS UNDER CLOSED LOOP CONTROLLED CONSTANT CONTACT PRESSURES AT DIFFERENT DIE TEMPERATURES

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During hot forming and tailor tempering of boron steels, heat transfer between work-piece and dies has an important effect on the temperature distribution, microstructure evolution and mechanical properties of the final formed parts. In the present paper the interfacial heat transfer coefficient (HTC) has been determined at different contact pressures. Experimental tests have been realized in a SCHMIDT micro servo-press, which is able to compensate the thermal contraction of the blank and tools to precisely keep constant the contact pressure. Temperature evolution of the tools and the blank has been monitored with nine thermocouples.

For the determination of the heat transfer coefficient (HTC), an analytical-numerical method has been used leading to a fast and reliable calculation method able to determine the evolution of the HTC value during the cooling of the blank. This methodology allows the calculation of different HTC values in function of the contact pressure and the instantaneous tool temperature which will improve the accuracy of the numerical models and the prediction of the final properties of the components.