

The Design of a Die for the Processing of Aluminum through Equal Channel Angular Pressing

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Abstract : The processing of metals through Equal Channel Angular Pressing (ECAP) leads to their remarkable strengthening. The ECAP dies control the amount of strain imposed on the material through its geometry, especially through the angle between the die channels, and thus the microstructural and mechanical properties evolution of the material. The present study describes the design of an ECAP die whose utilization and maintenance are facilitated, and that also controls the eventual undesired flow of the material during processing. The proposed design was validated through numerical simulations procedures using commercial software. The die was manufactured according to the present design and tested. Tests using aluminum alloys also indicated to be suitable for the processing of higher strength alloys.

Keywords : ECAP, mechanical design, numerical methods, SPD

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