

A hot-stamped coated steel part comprising a steel substrate and an aluminum alloy coating comprising, proceeding from steel substrate outwards, an interdiffusion layer and an outer layer, the total thickness of the coating e_{coating} and the thickness of the interdiffusion layer e_{IDL} satisfy in the following condition:

$$16 < E_{\text{pc}} < 40$$

$$E_{\text{pc}} = \sqrt{\left(\frac{33.3 - e_{\text{IDL}}}{0.9} + e_{\text{IDL}} - e_{\text{coating}}\right)^2 - 148(e_{\text{IDL}} - e_{\text{coating}})} - \left(\frac{33.3 - e_{\text{IDL}}}{0.9} + e_{\text{IDL}} - e_{\text{coating}}\right)$$

with Formula I The hot-stamped coated steel part comprises an undeformed portion having a thickness e_{pflat} from 0.6 mm to 3.5 mm, and at least one deformed portion. A lineic density of cracks dC_{min} the coating in the undeformed portion is higher than or equal to a minimum lineic density of cracks $dC_{\text{min}}(e_{\text{pflat}})$ defined as: Formula II.

$$dC_{\text{min}}(e_{\text{pflat}}) = 8 + 630 * e^{-3.772 - 1.15 * \arctan(4.16 * (e_{\text{pflat}} - 1.71))} - 638 * e^{-4.1 - 1.25 * \arctan(4.16 * (e_{\text{pflat}} - 1.71))}$$