

Performance of Metal Cans in the Packaging of Soluble Coffees

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SUMMARY

Metal cans present an excellent performance concerning interactions between the product and the package as well as protection against oxidation, due to their impermeability. Therefore their mechanical performance becomes the main requirement when new specifications are needed. Material reduction has been strongly pursued by the packaging industry in order to reduce costs and the use of natural resources.

Alternative metal cans destined to the packaging of soluble coffee (100 g), composed of cans with two different body thicknesses and another one with reduction of the bottom thickness were studied as to the characteristics of the closure system (easy opening ends) and the mechanical performance. In relation to the closure system, the aperture forces of two brands of full opening ends and one of peel off ends were determined, as well as the residual thickness of the end score line of the full opening ends. For this parameter, a destructive and a non-destructive method were compared. The mechanical performance of the cans was evaluated in relation to the resistance to the punctual impact on different positions of the can, the free fall, the axial load, the vacuum and the transport simulation.

It was verified that the thickness of the body plays an important role in the resistance to the vacuum, that varied from 616,5 mbar to 836,2 mbar for body thickness of 0,15 mm and 0,16mm, respectively. The mechanical characteristics of the bottom material influenced the damage resulting from the free fall impact and the axial load resistance, which presented resistance up to 640,4 kgf, quite superior to the requested value during stacking. Some damages in the cans were observed after about 3000 km of transport simulation. The most frequent alterations were bottom and end abrasions.

Concerning the end performance, there was a linear correlation between the rupture force and the residual thickness of the score line in the first opening area. Full opening and peel off ends presented aperture average forces of (5,2-6,5) kgf and 2,2 kgf, respectively. The residual thickness determined by the non-destructive method presented statistically different results in comparison with the destructive method.

These results permit the conclusion that additional plate thickness reduction is still possible in the production of metal cans for soluble coffee.