

## Plastika Balumag Money Box

Thermoformed money box out-performs metal in sledgehammer, axe test

**Thermoplastic Sheet Provides Impeccable Protection**

HOCHDORF, SWITZERLAND— To simulate real life robbery attempts, testers at Plastika Balumag AG, Hochdorf, Switzerland, swing fire axes and sledgehammers at thermoformed moneyboxes for up to 30 seconds, determining whether engineering plastics can prevent thefts of currency that steel cannot.

According to Reto Bamert, managing director, "Money boxes fabricated of steel proved easy for criminals to pry apart at riveted seams," prompting his client, Villiger Security, Benzenschwil, Switzerland, to consider thermoforming as an alternative.

"The first material we thermoformed was polycarbonate, but testers broke into the boxes within 10 seconds, and results for high impact ABS offered no improvement, as both materials proved to be notch sensitive. The boxes we thermoformed of KYDEX<sup>®</sup> 100, however, withstood the most determined efforts of our axe-wielding testers, who were unable to penetrate them after 30 seconds," Bamert said.

The material is a proprietary thermoplastic alloy that provides impact resistance of 960 J/m (18 ft-lb/in), modulus of elasticity of 2307 N/mm<sup>2</sup> (149 ton/sq.ft.), and tensile strength of 42 N/mm<sup>2</sup> (3ton/sq.ft.). It also carries fire retardancy ratings of UL Std 94 V-0 and 5V, and exhibits greater transparency to radio frequencies emitted by GPS transmitters contained in each money box than polycarbonate and high impact ABS, confirming Plastika Balumag's decision to utilize it.

The 200 x 400 x 250mm (7.870" x 15.750" x 9.840") exterior of the box is thermoformed of KYDEX<sup>®</sup> sheet in P-1 surface texture and 4.70mm (0.190") thickness, and the interior in 2.00mm (0.080") thickness. Before the parts are joined, a net is positioned between them, and a GPS antenna approximately 5.00mm (0.200") in diameter is affixed to the interior. Profile strips of 9.40mm (0.370") thick material are then welded to exterior edges to strengthen the box base and lid, and deburred to complete the process.

According to Bamert, the material forms well, although the depth of draw is only 200mm, and is easy to machine.

Villiger Security is replacing approximately 4500 steel money boxes carried by their Securicor vans in France with the new thermoformed box, and is marketing it successfully in Sweden, Norway and Germany.

Plastika Balumag, founded in 1969, has been thermoforming since 1980, and operates Geiss thermoforming machines with a maximum part size of 2.2m<sup>2</sup> and draw depth of 600mm, and Geiss five-axis C&C drilling machines. The company markets to transportation, furniture, display and automotive sectors and employs 45.



*Reto Bamert, managing director of Plastika Balumag AG, Hochdorf, Switzerland, with money boxes thermoformed of KYDEX<sup>®</sup> 100 thermoplastic alloy.*



*Moneyboxes thermoformed of KYDEX<sup>®</sup> 100 thermoplastic alloy resist penetration by axe- and sledgehammer-wielding testers longer than money boxes fabricated of steel.*

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