

Polymer banknotes in Romania

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Romania has now placed two series of polymer banknotes in circulation, so the article begins with a brief overview of the introduction of the plastic-based substrate in the country. It continues with figures from the National Bank of Romania on automatic banknote processing, to illustrate the greater durability of polymer banknotes. This is followed by a summary of the central bank's experience in connection with counterfeit polymer notes, to conclude with an overview of the advantages and disadvantages of the use of a polymer substrate.



Issue of polymer banknotes

Polymer banknotes first came into circulation in Europe in 1999. In that year a 2,000 leu polymer note was issued in Romania commemorating the total solar eclipse that was clearly visible throughout the country on 11 August 1999.

Following the successful launch of this new banknote, the other denominations were gradually changed over from paper to polymer. The 10,000 leu paper banknote was the first to be replaced by polymer; the next polymer banknote to be issued was a new higher denomination (the 500,000 leu note). A year later the 50,000 and 100,000 leu notes were printed on a polymer substrate and the series was finally completed with issue of the 1,000,000 leu note.

In 2005, pursuant to Act 348/2004 for creation of a new monetary unit, the "new leu", in Romania, a new series of banknotes was placed in circulation. These new banknotes had a new face value: one new leu equalled 10,000 old lei. Similar designs to those of the previous series were used to prevent confusion among the general public. The original issue consisted of six denominations: 1, 5, 10, 50, 100 and 500

leu. In 2006 the 200 leu banknote was added to the series and, in 2008, the 10 leu banknote printed in offset was launched. The new banknotes include security features such as intaglio printing, translucent images, transparent windows with highlighted transient images, optically variable ink (OVI), iridescent stripes, latent images, microperforations and magnetic thread.

Durability of polymer banknotes

The National Bank of Romania guarantees the authenticity, integrity and uniform quality of the banknotes in circulation. For this purpose, used banknotes are processed automatically and damaged banknotes are withdrawn. The central bank has nine automatic banknote processing machines, located in the four operational centres of the branch offices in Bucharest, Lasi, Cluj and Timis.

In 2007 the central bank processed 649 million banknotes, of which 26.7 million were deemed to be unfit. Accordingly, the percentage of banknotes deemed to be unfit for circulation was 4%, almost four times lower than in the euro area, as a result of the high quality and durability of the polymer substrate.

Polymer banknotes and counterfeiting

Polymer offers much greater security against counterfeiting than paper. In 2007 a total of 1,801 counterfeit banknotes were detected in Romania; this was a decrease of 16% on the previous year and represented 2.23 counterfeit notes per million banknotes in circulation.

Most of the counterfeit banknotes detected were printed on a paper substrate and did not include the security features. The most copied banknote was the 50 leu note; approximately 60% of these copies were printed on a plastic substrate that aimed to imitate polymer. The second most copied banknote was the 100 leu note; approximately 25% of these copies were printed on plastic. The plastic material used by the counterfeiters was similar to the genuine polymer substrate, but the design quality and counterfeiting technique were quite poor, as there were significant differences in the physical properties of the materials used. Moreover, no attempt was made to copy the security features, with the sole exception of a highly rudimentary copy of the transparent window. Silkscreen printing was used for the white opacifier and digital printing for the remainder, probably using a high resolution inkjet printer.



Front of 500 leu banknote.

The plastic-based substrate used for the counterfeit notes was not the biaxially-oriented polypropylene that is used for the genuine banknotes. Instead the substrate used was ordinary polypropylene used for packaging, which has a different density and a rough surface in contrast to the smooth surface of biaxially-oriented polypropylene. Moreover, the genuine polymer substrate is thicker than the plastic material used in the counterfeit notes.

polymer banknotes do not absorb or retain moisture, oil, smells, bacteria or dirt;

- **easy machine-processing:** in most cases, polymer banknotes cause fewer processing problems than their paper counterparts in banknote processing machines and cash dispensing machines;
- **recycling potential:** polymer banknotes may be recycled at the end of their lifetime and used to produce a whole range of plastic products; this is a distinct advantage in terms of environmental sustainability.

Conclusion

After almost a decade of experience in Romania, polymer banknotes have been seen to be considerably more durable and to offer considerably more security than paper banknotes. The non-fibrous nature of the polymer substrate means that it does not tear after repeated folding, as paper banknotes tend to do, and it makes polymer banknotes stronger and less likely to tear. With the shift to polymer, Romania joined the group of countries that have chosen to employ highly advanced technology in banknote production.

Advantages and disadvantages of polymer as a banknote substrate

Key advantages of polymer over paper:

- **increased security against counterfeiting:** polymer is in itself a security feature;
- **longer average life of banknotes:** the durability of banknotes printed on a plastic-based substrate is at least three times greater than that of those printed on paper;
- **less absorption of dirt:** since the substrate is non-porous and bears a protective coating,

Key disadvantages of a polymer substrate:

- **the length of time polymer banknotes maintain alterations in their form,** for example, folds;
- **the strength of the plastic material,** which can easily damage some mechanical components of cash processing machines;
- **the difficulties involved in identifying by mechanical means** some of the security features of banknotes at the end of their lifetime.