Investigation of possible residues of fog of the Bandit Security System

1.   Aim

The Textile department of the TNO Institute of Industrial Technology has investigated if the untransparent 'fog' as generated by the Bandit security system (for indoors) could be harmful.
Because one could suspect that porous materials collect the most residual deposit the investigation has focussed on textile materials as used in clothing.
Experiments had to prove if there is any residue left on the fabric after a certain amount of time is passed since the Bandit security system was activated. By using gas chromatography the amount of fog-ingredients was measured (quantitative analysis). Besides this the appearance of the cloth was rated visual in order to see if there were any changes.

2.   Working-method

For the quantitative analysis three common textile materials were used: cotton, polyester and wool. The samples were standardised fabrics, produced according to ISO 105/F. This means there are no finishing chemicals or any other residue on the original material. Besides these materials also a suede material and a pile was rated visual. Also a direct dyed material was exposed to the fog because one could expect that especially direct dye tend to migrate after wetting.

The fabrics were pinned to a clothesline in an office space of 36,6 m^3 without forced ventilation. Each sample measured 20 by 20 centimetres. The Bandit was activated. The supplier had limited the time in which the Bandit produced fog to two seconds. After twenty minutes exposure to the fog, part of the samples were removed from the room and examined. By this time the room was also ventilated by opening the windows. The fog could slowly leave the room through the window. After 24 hours the remaining samples were also examined.

De visual assessment took place under standardised circumstances. A Varian 3600 and HP 3396 A gas chromatograph with ECONO-CAP column (Carbowax 30m x 0,32 mm ID x 0,25 micrometer) was used for the quantitative analysis.

It was also tested if the Bandit fog is flammable. For this a burning chamber with ignition source (a burner) was filled with fog.

3. Results

3.1 Residue

3.1.1 Visual assessment

During the visual assessment no differences could be detected between the reference samples (samples not exposed to the fog), the samples after twenty minutes exposure and monsters taken out of the room after 24 hours.

3.1.2 Quantitative measurements

The quantitative results with the use of gas chromatography were:

Table 1, the amount of 'fog' in grams as could be detected in the samples of 400 cm^2. The accuracy of the measurements is better than 7%.

Sample	no 'mist'	after 20 minutes	after 24 hours
wool	0 (not measurable)	0,000039	0,000020
cotton	0 (not measurable)	0,000097	0,000063
polyester	0 (not measurable)	0,000095	0,000002

With porous fabrics like wool and cotton, some fog residue on the substrates could be detected with laboratory equipment after 24 hours. The results show that during the test the amount of fog residue on the substrate decreases. With less porous substrates like polyester, the fog residue could hardly be detected after 24 hours (which means that the residue has evaporated by that time).

3.2 Flammability

There were no signs that the ignition source burned faster under the influence of the fog. Due to the force by which the fog leaves the Bandit and the air which is pushed aside by the fog it is more likely that ignition source is extinguished by activation of the Bandit.

4. Conclusions

The experiments give no reason to assume that the fog as generated by the Bandit security system, has any influence on the appearance or touch of textile or leather materials if the guidelines as given by the supplier are followed.
The guidelines refer to the amount with which the room should be filled with fog (density advised is one gram per m^3) and the ventilation after activation of the Bandit (there should be sufficient ventilation after the response to the alarm).

Results of the investigation of
residue of the Bandit security system