Specification

TK08 Lead Detection Test Kit

for various materials such as paint coatings electronics and metals

Introduction

The Lead Detection Test Kit is used for the detection of lead in various materials such as paint coatings, electronics and metals. The test is highly sensitive to the presence of lead, and will therefore always turn pink or red in standard lead-containing paint layers.

Sensitivity of the lead test

The sensitivity of the lead test has been tested with different amounts of lead (see Figure 1). A clear gradation in colour can be seen as the amount of lead varies from low to high. As expected, there is no red colouration when no lead is present. If less than 5 µg of lead is present, no clear discolouration is visible anymore (below the detection limit). Lead-containing paint layers contain much more lead than the detection limit and will therefore always be detected by the lead test.

Figure 1. Results of the lead test with various amounts of lead.

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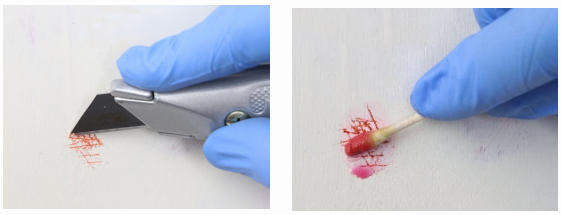
Sensitivity for detection of lead in paint layers

The sensitivity of the lead test on dry lead-based paint layers has been tested in practice. Tests were carried out on wood with a lead-containing (lead (II,IV) oxide) primer coat topped with a lead-free paint coat, as is usually the case in practice.

The tests were carried out according to the standard procedure of the test kit (see Figure 2). The paint layer was incised beforehand with a clean Stanley knife to expose the base coat. After this, the moistened end of the test swab was rubbed over the paint layer to be examined for about half a minute.



(a) (b)

Figure 2. Testing at paint layers (a) incision (b) rubbing of test rod on paint layer.

Table 1 shows the results. If the soil layer has a lead content of only 1% lead, it will already be detected (red/pink colouring). Since soil layers consisting of standard lead paint have a higher lead content (25-65%), these layers will always be detected using this test (red colouring).

Table 1. Test results of paint layers consisting of a lead-based primer and a paint layer.

		
Prime coat with 25-65 % lead with a lead-free paint layer on top.	Primer containing 1 % lead with a lead-free paint coating on top.	Lead-free primer with a lead-free lacquer coating on top.

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Reactions with substances containing lead

The test swabs of all tested substances in which lead is present colour clear red (see Table 2). The red colouration of the test swabs remains thereafter for several days.

Table 2. Test results of various lead-containing substances.

Test material	Concentration	Colour test swab
Paint layer orange lead paint (lead (II,IV) oxide)	± 50 % lead*	**Red**
Ground layer of orange lead paint with non-lead paint cut in with Stanley knife	± 50 % lead* (primer)	**Red**
Lead(IV) acetate	55 % lead	**Red**
Lead(II) chromate	64% lead	**Red****
Lead(II) nitrate	63 % lead	**Red**
Lead white ($PbCO_3$)	78 % lead	**Red**
Lead (metal)	100% lead	**Red**
Leaded tin	40% tin; 60% lead	**Red**
Leaded brass (C37700)	Alloy; 3% lead	**Red**
Leaded bronze (CuSn10)	Alloy; 0.8% lead	**Red**

* Weight percentage relative to the total weight of the (dried) paint.

** The test swab with lead(II) chromate first turns bright orange and after about 30 minutes bright red. All other lead-containing substances tested in this table lead to an immediate red colouration of the test swab within a few seconds to a few minutes.

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Reactions with materials without lead

To determine any cross-reactions of the test swabs from the Lead Detection Test Kit with other materials, we tested the test swabs with various types of materials that do not contain lead (see Table 3). All test swabs applied to materials without lead, coloured yellow and after a few minutes light yellow or white.

Thus, no cross-reactions were found: the test swab colours red only if lead is present in the tested material, as expected.

Table 3. Test results of various non-lead substances.

Testmaterial	Concentration	Colour test swab
Normal primer and coating without lead incised with Stanley knife	0% lead	yellow/white
Aluminium	100% aluminium; 0% lead	yellow/white
Cadmium	100% cadmium; 0% lead	yellow/white
Alloy S235JR (structural steel)	0% lead	yellow/white
Iron	100% iron; 0% lead	yellow/white
Copper	100% iron; 0% lead	yellow/white
Manganese	100% manganese; 0% lead	yellow/white
Magnesium	100% magnesium; 0% lead	yellow/white
Alloy 316 (stainless steel)	0% lead	yellow/white
Tin	100% tin; 0% lead	yellow/grey*
Vanadium	100% vanadium	yellow/white
Tungsten	100% tungsten	yellow/white
Zinc	100% zinc; 0% lead	yellow/white

* Grey due to release of tin on test swab.

Notes
All percentages in this specification are in weight percentages.

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