

EuroLatex ECO Standard test specification for latex foam cores

english version

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1. Samples

For testing and reference sample purposes, two samples of the test material (each 25 cm x 20 cm x height), taken out of the middle of a core are to be sent by the applicant to the test house, air-tight sealed (bonded seal) in aluminium foil and polyethylene film. All relevant information for each type of material to be tested shall be mentioned on an application sheet (nature of the production process: Talalay/Dunlop... type formulation, foam density, etc).

Each of the tests detailed below is performed on latex cores from current production that have been dispatched within one week of manufacture.

2. Testing

The manufacture of products is according to *the state of the art* and must not involve harmful substances such as asbestos, chlorofluorocarbons and dyestuffs which can release cancerogenic amines under certain circumstances. To avoid any contamination via intermediates, special certificates are requested by the raw material supplier.

This contaminant testing within Eurolatex ECOstandard at the present time is performed for such harmful substances as could have entered the product via intermediates.

The testing is performed on:

2.1 Contamination test. At the present time this extends to the following substances or classes of substances:

- pentachlorophenol, salts and esters
- pesticides (according the list of 3.1.2)
- butadiene
- vinyl chloride
- heavy metals

2.2 Emission test. At the present time this extends to the following substances or classes of substances:

- testing on the emission of volatile organic compounds
- testing on the emission of formaldehyde
- testing on the emission of volatile nitrosamines (list of substances according 2.3.)

3 Short description of the test methods

3.1 Test methods for contaminant testing

3.1.1 Pentachlorophenol

5 g of the test sample are comminuted and the pentachlorophenol that may be present in the form of phenol (PCP) or the sodium salt (SPP) or esters is extracted in several stages. The extracts are subjected to various preparatory treatments and then analysed by gas chromatography. Detection is by mass spectrometer or electron capture detector (ECD). The method has a determination threshold of 0.1 mg/kg.

3.1.2 Pesticides

A 2 g specimen is extracted in an ultrasonic bath with a hexane/dichloromethane mixture (85/15). The extract is cleaned up by acetonitrile agitation or by adsorption chromatography over florisil. Measurement and quantification are by gas chromatography with detection on an electron capture detector or by coupled gas chromatography/mass spectrometry. The determination threshold for each component is 40 µg/kg.

Testing is performed for the following pesticides:

- | | |
|------------------------|--------------------|
| - lindane and others | - malathion |
| - hexachlorcyclohexane | - dichlorfenthion |
| - hexachlorbenzene | - parathion-methyl |
| - aldrin | - parathion-ethyl |
| - endrin | - o,p=-DDE |
| - dieldrin | - p,p=-DDE |
| - heptachlor | - o,p=-DDD |
| - heptachlorepoxyde | - p,p=-DDD |
| - methoxichlor | - o,p=-DDT |
| - mirex | - p,p=-DDT |
| - diazinone | |
| - dichlorvos | |

Note: The testing on pesticides is requested for products with at least a content of 20% natural latex

3.1.3 Butadiene

Following comminution and weighing of the foam latex article headspace sampling is performed and determination is made by gas chromatography with detection by flame ionisation detector. The determination threshold of the method for 1.3 butadiene is 1 mg/kg. Alternatively a certificate of the raw material supplier can be requested.

3.1.4 Vinyl chloride

Vinyl chloride is determined by the method described in 3.2. The determination threshold of the method is 0.0001 mg/m³;

3.1.5 Extractable heavy metals

The comminuted sample material is eluted in accordance with DIN 38414-S4 in a ratio of 1:10. The resultant filtrate is passed through a 0.45 µm membrane filter (if necessary by pressure filtration). The solution obtained is then examined for the content of heavy metals by atomic emission spectrometry with inductively coupled plasma (ICP-OES) or by atomic absorption spectrometry using a hydride or cold vapour process.

3.1.6 Threshold tolerances for listed contaminants

Under the testing conditions described, the contaminants listed must not be detectable or must not be detectable above the specified threshold tolerances.

The heavy metals listed below must not exceed the following values:

		threshold limit - euroLatex - [mg/kg]
arsenic	As	0.5
lead	Pb	0.5
cadmium	Cd	0.1
chromium (tot.)	Cr	1
cobalt	Co	0.5
copper	Cu	2
nickel	Ni	1
mercury	Hg	0.02

3.2 Emission testing

The emission testing includes a test on volatile organic compounds (VOC), a determination of formaldehyde and an analysis of volatile nitrosamines. The testing of these target compounds will be performed by emission chamber method. The test method is based on the ENV 13419-1, which describes the conditions of the chamber test.

3.2.1 Conditioning

The wrapped sample should be stored at room temp. at least for 24 hours. After this period the sample will be unwrapped and immediately transferred into the test chamber.

3.2.2 Testing conditions

The sample will be placed on a sample holder, which allows air access from all sides. The climatic factors should be adjusted according to ENV 13419-1. For comparison of test results the area specific ventilation rate ($q=n/l$) should be 1. The ventilation rate should be between 0,5 and 1. The air sampling will be started 24 hours after chamber loading and finished latest 30 hours.

3.2.3 Air sampling and analysis

Air sampling and analysis is based on the following international standards:

- Volatile organic compounds (VOC): DIN ISO 16000-6
- formaldehyde DIN ISO 16000-6 or VDI 3484-1
- nitrosamines: Hauptverband der gewerblichen Berufs-
genossenschaften ZH 1/120.23

3.2.4 limit values

The following limit values are specified

➤ **volatile organic compounds**

latex based compounds

Individual constituents

toluene	0.1	mg/m ³ ;
vinylcyclohexene	0.002	mg/m ³ ;
styrene	0.01	mg/m ³ ;
4-phenylcyclohexene	0.02	mg/m ³ ;

Cumulative parameters

aromatische hydrocarbons	0.3 mg/m ³ ;
volatile organic compounds	0.5 mg/m ³ ;

Tolerance limits for emissions of solvents

Further tolerance limits are also to be observed for various solvents which do not emanate from the latex used and from foam latex production, but which can nevertheless occasionally occur in the emission spectrum of foam latex cores through contamination (e.g. from adhesives and cleaning agents).

Individual constituents

1,1,1-trichlorethane	0.2	mg/m ³ ;
tetrachlorethylene	0.15	mg/m ³ ;
trichlorethylene	0.05	mg/m ³ ;

➤ **Formaldehyde**

The limit value for the emission of formaldehyde is set to 0.01 mg/m³.

➤ **Nitrosamines**

The limit value for the emission of volatile nitrosamines is set to 0.001 mg/m³.

The following nitrosamines, classified as cancerogenic according to TRGS 552 from November 1997 are tested:

n-nitrosodimethylamine	(NDMA)
n-nitrosodiethylamine	(NDEA)
n-nitrosomethylethylamine	(NMEA)
n-nitrosodi- i-propylamine	(NDIPA)
n-nitrosodi- n- propylamine	(NDPA)
n-nitrosodi- n- butylamine	(NDBA)
n-nitrosopyrrolidinone	(NPYR)
n-nitrosopiperidine	(NPIP)
n-nitrosomorpholine	(NMOR)

4 Test results

If the euroLatex Eco-Standard criteria described above are met, this will be specified in a test report. This test report is basis for the certificate the euroLatex ECO-Standard.

5 Transferability of the certificate to other products of the applicant

Transferability of the test results is possible only to products that are manufactured with similar production equipment from the same raw materials, by the same recipes and by the same process. It is the responsibility of the foam latex manufacturer as the applicant to the test house to comply with these conditions. If these conditions are met, the test certificate may also be used for these products.

6 Validity of the test

The certificate is verified every two years.