



## Report 50551 Test Report

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### Application

Testing of the interlining of children ski helmets according to residues from the production.

### Test Material

ski helmets

Material used in testing was anonymized for laboratory purposes. A detailed sample list is contained in the report.

### Issuing and Signatures

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# 1 Order

## 1.1 Chronology

<i>Date</i>	<i>Received</i>	<i>Order</i>
2005-10-19	2005-10-27	Testing of the interlining of children ski helmets according to residues from the production.

## 1.2 Samples

<i>No.</i>	<i>Received</i>	<i>Sample Identification</i>	<i>Sample Material</i>
1	2005-10-27 <sup>(1)</sup>	"Salomon Fierce Camo, Art.nr. 784 469 55, Size 55"	helmet, 1 piece
2	2005-10-27 <sup>(1)</sup>	"Salomon Shadow, Art.nr. 20.5.805.611.2.520, Size XS"	helmet, 1 piece
3	2005-10-27 <sup>(1)</sup>	"Marker Tracer, Art.nr. 62002501 001, Size XS 52"	helmet, 1 piece
4	2005-10-27 <sup>(1)</sup>	"Uvex x-ride motion, Art.nr. S5660723304, Size 55-56"	helmet, 1 piece
5	2005-10-27 <sup>(1)</sup>	"Carrera Nerve jr 2.5, Art.nr. E00230, Size 5200 XXS"	helmet, 1 piece
6	2005-10-27 <sup>(1)</sup>	"Salomon MACH 2 JR RC, Art.nr. 782 916 52, Size 52"	helmet, 1 piece
7	2005-10-27 <sup>(1)</sup>	"CÈBÈ (rot), Size 56"	helmet, 1 piece
8	2005-10-27 <sup>(1)</sup>	"ALPINA Twister/2005, Size 52/56"	helmet, 1 piece
9	2005-10-27 <sup>(1)</sup>	"EQ Junior, Size 56"	helmet, 1 piece
10	2005-10-27 <sup>(1)</sup>	"EQ Wind Joker/2003, Size 56-58"	helmet, 1 piece
11	2005-11-07 <sup>(1)</sup>	"Atomic Pro-Tect, weiß/rot, Gr. XS und XXS"	helmets, 2 pieces
12	2005-11-07 <sup>(1)</sup>	"Champion TecnoPro, gelb, Gr. 55 und 58"	helmets, 2 pieces
13	2005-11-07 <sup>(1)</sup>	"Briko WS2 Antesi "Girly Power", weiß, Gr. 56 und 58"	helmets, 2 pieces
14	2005-11-07 <sup>(1)</sup>	"Scott Cristal JR. Skihelm 44, grau, Gr. XS/52"	helmets, 2 pieces
15	2005-11-07 <sup>(1)</sup>	"Riot F2 "Free Ride", silber, Gr. 0000"	helmets, 2 pieces

(1) Samples provided by the customer. (2) Sample drawn by ÖTI.



### 1.3 Titel of the order

Testing of the interlining of children ski helmets according to residues from the production especially pH-value, formaldehyde, forbidden arylamines, allergens colorants, heavy metals, colour fastness to sweat, chlorinated phenols and GC/MS-screening test.

## 2 Findings

The samples have been delivered by the applicant.

Because sample 1 has too less interlining no tests have been done on this helmet.

The interlining of the helmets is mostly laminated (fabric and foam). Therefore the tests have been made with the composition.

## 3 Tests performed and results

According to the order all tests, except the GC/MS screening test, have been made according to Oeko-Tex Standard 100 and the testing procedures laid down in Oeko-Tex standard 200. The limit values mentioned in the resultlists are for productclass II, articles with direct contact to skin.

### 3.1 Determination of the pH-value

The pH value is determined according to EN 1413.

#### 3.1.1 Results

Sample	pH-value
2	6,0
3	5,6
4	6,3
5	4,8
6	4,6
7	4,9
8	5,1
9	5,1
10	4,9
11	6,9
12	6,5
13	6,2
14	6,4
15	6,3
Limit value	4,0 – 7,5



## 3.2 Determination of Formaldehyde

The test is performed as given by the Japanese law "Harmful Substance - Containing Household Products Control Law No. 112". According to this method the content of free and partially releasable formaldehyde is integrally determined in aqueous extract using the acetyl-acetone method by means of a spectrophotometer.

### 3.2.1 Results

Sample	Formaldehyde [ppm]
2	not detected
3	not detected
4	not detected 0
5	not detected
6	< 20
7	< 20
8	not detected
9	< 20
10	not detected
11	< 20
12	not detected
13	not detected
14	not detected
15	not detected
<b>Limit value</b>	<b>75 ppm</b>



### 3.3 Test for Azo-dyes, which may be cleaved into arylamines of MAK-group III, categories 1 and 2 under reductive conditions Evaluation

The tests are carried out following the official test methods of EU-Directive 76/769/EWG:

EN 14362-1

EN 14362-2(PES)

Following azo-dyes are listed in the Oeko-Tex Standard 100:

<u>Name</u>	<u>CAS-No.</u>
<b><i>MAK III, Category 1</i></b>	
4-Aminobiphenyl	92-67-1
Benzidin	92-87-5
4-Chlor-o-toluidin	95-69-2
2-Naphthylamin	91-59-8
<b><i>MAK III, Category 2</i></b>	
o-Aminoazotoluol	97-56-3
2-Amino-4-nitrotoluol	99-55-8
4-Chloranilin	106-47-8
2,4-Diaminoanisol	615-05-4
4,4'-Diaminobiphenylmethan	101-77-9
3,3'-Dichlorbenzidin	91-94-1
o-Dianisidin	119-90-4
3,3'-Dimethylbenzidin	119-93-7
4,4' -Diamino-3,3'dimethylbiphenylmethan	838-88-0
p-Kresidin	120-71-8
4,4'-Diamino-3,3'-dichlorbiphenylmethan	101-14-4
4,4'-Diaminobiphnylether	101-80-4
4,4'-Diaminobiphenylsulfide	139-65-1
o-Toluidine	95-53-4
2,4-Diaminotoluol	95-80-7
2,4,5-Trimethylanilin	137-17-7
o-Anisidin	90-04-0
2,4-Xylidin	95-68-1
2,6-Xylidin	87-62-7



<b>Substances which are known to be able to cause cancer in human beings</b>		
<b><u>C.I. Generic Name</u></b>	<b><u>C.I. Structure number</u></b>	<b><u>CAS-Nr.</u></b>
C.I. Acid Red 26	C.I. 16 150	3761-53-3
C.I. Basic Red 9	C.I. 42 500	25620-78-4
C.I. Basic Violet 14	C.I. 42 510	632-99-5
C.I. Direct Black 38	C.I. 30 235	1937-37-7
C.I. Direct Blue 6	C.I. 22 610	2602-46-2
C.I. Direct Red 28	C.I. 22 120	573-58-0
C.I. Disperse Blue 1	C.I. 64 500	2475-45-8
C.I. Disperse Orange 11	C.I. 60 700	82-28-0
C.I. Disperse Yellow 3	C.I. 11 855	2832-40-8

### 3.3.1 Results

<b>Sample</b>	<b>Arylamines</b>
2	not used
3	not used
4	not used
5	not used
6	<b>2,4-Toluylendiamin</b>
7	not used
8	not used
9	<b>2,4-Toluylendiamin</b>
10	not used
11	<b>2,4-Toluylendiamin</b>
12	not used
13	<b>2,4-Toluylendiamin</b>
14	not used
15	<b>2,4-Toluylendiamin</b>
<b>Limit value</b>	<b>not used</b>



### 3.4 Test for dyestuffs, classified as allergenic

The identification of extracted dyes is made by means of chromatographic methods (HPLC – High pressure liquid chromatography)) in comparison to reference substance.

According Oeko-Tex Standard 100 the listed substances are not allowed to be detected.

The following substances are listed in the Oeko-Tex Standard 100:

<u>C.I. Generic Name</u>	<u>C.I. Structure number</u>	<u>CAS-Nr.</u>
C.I. Disperse Blue 1	C.I. 64 500	2475-45-8
C.I. Disperse Blue 3	C.I. 61 505	2475-46-9
C.I. Disperse Blue 7	C.I. 62 500	3179-90-6
C.I. Disperse Blue 26	C.I. 63 305	
C.I. Disperse Blue 35		12222-75-2
C.I. Disperse Blue 102		12222-97-8
C.I. Disperse Blue 106		12223-01-7
C.I. Disperse Blue 124		61951-51-7
C.I. Disperse Brown 1		23355-64-8
C.I. Disperse Orange 1	C.I. 11 080	2581-69-3
C.I. Disperse Orange 3	C.I. 11 005	730-40-5
C.I. Disperse Orange 37	C.I.11 132	
C.I. Disperse Orange 76	C.I.11 132	
C.I. Disperse Red 1	C.I. 11 110	2872-52-8
C.I. Disperse Red 11	C.I. 62 015	2872-48-2
C.I. Disperse Red 17	C.I. 11 210	3179-89-3
C.I. Disperse Yellow 1	C.I. 10 345	
C.I. Disperse Yellow 3	C.I. 11 855	2832-40-8
C.I. Disperse Yellow 9	C.I. 10 375	6373-73-5
C.I. Disperse Yellow 39		
C.I. Disperse Yellow 49		



### 3.4.1 results

Sample	Allergen dyes
2	not detected
3	<b>Disperse Orange 37/76</b>
4	not detected
5	not detected
6	<b>Disperse Orange 37/76</b>
7	not detected
8	not detected
9	not detected
10	not detected
11	<b>Disperse Orange 37/76</b>
12	not detected
13	not detected
14	not detected
15	not detected
Limit value	<b>not detected</b>



### 3.5 Determination of extractable heavy metals

The quantitative determination of the heavy metal components is performed by ICP after extraction with acidic sweat solution.

#### 3.5.1 Results

Sample	Metal in ppm				
	Mercury	Arsenic	Lead	Cadmium	Chromium
2	< 0,01	< 0,1	< 0,1	< 0,05	< 0,1
3	< 0,01	< 0,1	< 0,1	< 0,05	< 0,1
4	< 0,01	< 0,1	< 0,1	< 0,05	0,5
5	< 0,01	< 0,1	< 0,1	< 0,05	0,2
6	< 0,01	< 0,1	< 0,1	< 0,05	< 0,1
7	< 0,01	< 0,1	< 0,1	< 0,05	0,3
8	< 0,01	< 0,1	< 0,1	< 0,05	0,4
9	< 0,01	< 0,1	< 0,1	< 0,05	< 0,1
10	< 0,01	< 0,1	< 0,1	< 0,05	0,4
11	< 0,01	< 0,1	< 0,1	< 0,05	0,2
12	< 0,01	< 0,1	0,1	< 0,05	0,2
13	< 0,01	< 0,1	0,1	< 0,05	< 0,1
14	< 0,01	< 0,1	0,7	< 0,05	0,5
15	< 0,01	< 0,1	1,1	< 0,05	< 0,1
Limit value	0,02	1,0	1,0	0,1	2,0



Sample	Metal in ppm				
	Cobalt	Copper	Nickel	Antimony	Chromium VI
2	< 0,1	< 4	1,9	< 0,5	< 0,5
3	< 0,1	< 4	1,8	< 0,5	< 0,5
4	< 0,1	< 4	1,5	< 0,5	< 0,5
5	< 0,1	< 4	< 0,1	< 0,5	< 0,5
6	< 0,1	< 4	< 0,1	< 0,5	< 0,5
7	< 0,1	< 4	< 0,1	< 0,5	< 0,5
8	< 0,1	< 4	< 0,1	< 0,5	< 0,5
9	< 0,1	< 4	< 0,1	< 0,5	< 0,5
10	< 0,1	< 4	< 0,1	< 0,5	< 0,5
11	< 0,1	< 4	< 0,1	< 0,5	< 0,5
12	< 0,1	< 4	7,0	< 0,5	< 0,5
13	< 0,1	< 4	7,0	< 0,5	< 0,5
14	< 0,1	< 4	7,1	< 0,5	< 0,5
15	< 0,1	< 4	7,7	0,7	< 0,5
Limit value	4,0	50,0	4,0	30,0	not detected



### 3.6 Testing of colour fastness

The colour fastness to acidic and alkaline perspiration is tested according to ISO 105-E04.

Sample	Acidic perspiration note	Alkaline perspiration note
1	PES 4-5/ WO 5	PES 4-5/ WO 5
2	PES 4-5/ WO 5	PES 4-5/ WO 4-5
3	PES 4-5/ WO 5	PES 4-5/ WO 4-5
4	PA <b>2-3</b> / WO 4	PA <b>2-3</b> / WO 3-4
5	PA 5/ WO 5	PA 5/ WO 5
6	PES 5/ WO 5	PES 5/ WO 5
7	PA 4-5/ WO 4-5	PA 4-5/ WO 5
8	PA 5/ WO 5	PA 4-5/ WO 5
9	PES 5/ WO 5	PES 5/ WO 5
10	PA 5/ WO 5	PA 5/ WO 5
11	PES 5/ PA 4- 5	PES 5/ PA 4- 5
12	PA 4-5/ WO 5	PA 4-5/ WO 5
13	PES 4-5/ WO 5	PES 4-5/ WO 5
14	PES 5/ PA 5	PES 4-5/ PA 4- 5
15	PES 4-5/ WO 5	PES 4-5/ WO 4-5
<b>Limit value</b>	<b>3-4</b>	<b>3-4</b>



### 3.7 Determination of the content of phenols (chlorinated and OPP)

The pentachlorophenol (PCP), 2,3,5,6-tetrachlorophenol (TeCP) or ortho-phenylphenol (OPP) content is determined. For analysis gas chromatography is used with mass spectrometric detection (MSD).

#### 3.7.1 results

Sample	PCP [ppm]	TeCP [ppm]	OPP [ppm]
1	< 0,1	< 0,1	< 0.5
2	< 0,1	< 0,1	< 0.5
3	< 0,1	< 0,1	< 0.5
4	< 0,1	< 0,1	< 0.5
5	< 0,1	< 0,1	< 0.5
6	< 0,1	< 0,1	< 0.5
7	< 0,1	< 0,1	< 0.5
8	< 0,1	< 0,1	< 0.5
9	< 0,1	< 0,1	< 0.5
10	< 0,1	< 0,1	< 0.5
11	< 0,1	< 0,1	< 0.5
12	< 0,1	< 0,1	< 0.5
13	< 0,1	< 0,1	< 0.5
14	< 0,1	< 0,1	< 0.5
15	< 0,1	< 0,1	< 0.5
<b>Limit value</b>	<b>0,5</b>	<b>0,5</b>	<b>100</b>



### 3.8 Qualitative screening test with GC/MS

The analysis is used for screening of harmful organic substances which could be in some of the testing material.

The test is done by extracting the samples with an organic solvent followed by gaschromotgraphy with a mass selective detector (GC/MS). The identification of the components is done by comparison with spectrometers using a MS-library.

The detection limit of the method is about 10 µg/ml.

#### 3.8.1 Results

In the samples no substances which are not typical for the material composition could be found. These substances are phthalates, which are from the polyester.

## 4 Evaluation

The 15 samples have been provided by the applicant (see photo documentation). The tests have been done on the interlining of the helmets. All interlinings are laminates (fabric and foam) and tested as such.

As requested all tests have been made according to the requirements of the Oeko-Tex Standard 100, product class II, except an additional gaschromatographical screening. The Oeko-Tex Standard 100 was founded 1992 by the International Association for Research and Testing in the Field of Textile Ecology (Oeko-Tex). The limit values are divided into four product classes: Product class I for baby articles, product class II for articles with direct contact to skin, product class III for articles without direct contact to skin and product class IV for decoration material.

The results of the test show that three samples contain allergenous colorants. Four samples do not fulfil the requirements of the heavy metal release.

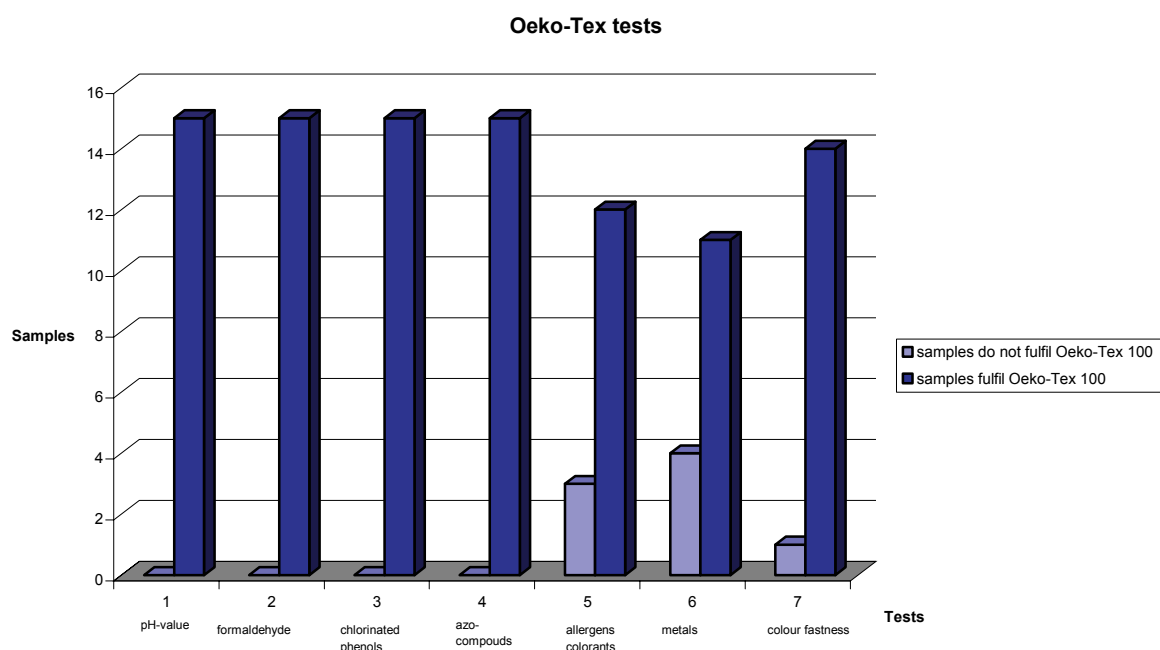
Sample 4 has a colour fastness which does not fulfil the requirements of the Oeko-Tex Standard 100 product class II.

In no sample the pH-value, formaldehyde and chlorinated phenols are exceeding the limit values.

In the test for forbidden cleavable azo colorants 2,4-Toluyldiamin has been found. It is a well established fact though, that the testing method, which was developed for dyestuffs on textile fibres can give false positive results on foams. Thus the results are only indicative, as at the moment no other testing method is available.

The GC/MS screening test shows that no substances have been found that are unusual for these materials (phthalates from the polyester).

Summarizing, it can be said that 53% of the tested samples would not be acceptable for an Oeko-Tex 100 certification.





## 5 Remarks

### Sample Material

Results of performed tests only refer to the sample material provided.

Without explicit written other agreement testing is destructive and the sample material is transferred to the property of ÖTI, which is entitled to freely decide on storage and disposal.

### Quality management and accreditations

All tests and services are performed under a quality management system according to EN ISO 17025.

ÖTI is accredited by several organisations for various tests offered. It also is a Notified Body with the registration number 0534. The accreditation by the Federal Ministry as testing laboratory was repeated under AK 92714/263-I/12/04 (Individual accredited test procedures are marked with the federal laboratory logo), the accreditation for testing and surveillance of building products was given by the OIB (Österreichisches Institut für Bautechnik). Details and other accreditations are given on request and can be found on [www.oeti.at](http://www.oeti.at).

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End of Report

## Photodocumentation



Sample 2



Sample 2



Sample 3



Sample 3



Sample 4



Sample 4



Sample 5



Sample 5



Sample 6



Sample 6



Sample 7



Sample 7



Sample 8



Sample 8



Sample 9



Sample 9



Sample 10



Sample 10



Sample 11



Sample 11



Sample 12



Sample 12



Sample 13



Sample 13



Sample 14



Sample 14



Sample 15



Sample 15