DANISH MINISTRY
OF THE ENVIRONMENT

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Protection Agency

A mapping of products and material used within live role-play

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CASA

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Introduction

During the past years, live role-playing has become an increasingly popular hobby among children and youth.

When performing role play, equipment is used that is ready-bought or is home-made by the role players. This equipment may comprise weapons, suits, artificial noses/ears, masks, etc.

The Danish Environmental Protection Agency has requested a survey of the range of products that are marketed for live role-playing, including which kind of materials are used in the production of equipment, the extension of use in Denmark and which substances children and youth are exposed to during manufacture and play.

This report comprises a mapping of the materials and ready products that are marketed and used in role playing. Furthermore, a survey was conducted of the methods and procedures used in youth centres in order to map the possible problems arising when producing your own role-play equipment.

The overall aim of the project is to get an overview of the types of role-play equipment used and the content of dangerous substances in these and whether these could pose a risk to peoples' health – An evaluation of the health risks as such is not an aim of this project. The Danish Environmental Protection Agency will consider the need for such a study on the basis of the present report.

Summary and conclusions

The Danish Environmental Protection Agency has requested a survey of the range of products within live role play, including what kind materials that are used when children and youth produce their own role-play equipment. Equipment includes weapons, suits, artificial noses/ears, masks, etc.

During the past years, live role-playing has become an increasingly popular hobby among children and youth. It is estimated that within one year as many as 100.000 children and youth (mostly boys) between 8 and 18 will to some degree participate actively in role playing – and almost all boys will at some point in their childhood/youth be involved in this activity.

As this niche has developed into a more common leisure activity for children and youth, a market has evolved providing equipment and merchandise for live role play. The trade is charecterised by its crusading spirit, and it is only within the last few years that the great toy stores and supermarkets have joined in.

Through visits to Danish producers and distributors of equipment for live role play and investigations of various home pages, CASA has mapped out various types of equipment and the extension of the ready products that are commercialised and used in role play. The materials and the production of home-made products have also been mapped. The overall purpose of the survey was to investigate if the role-play activity involved materials that could pose a risk to the environment or people's health.

A large amount of the home-made equipment is being produced in after school day care and youth centres. This project includes a survey of the extension of the home-made equipment, what materials are being used in the production of this equipment (primarily various types of weapons) and what methods and procedures are most common in e.g. youth centers. The main part of the materials used in the production of home-made role-play weapons are not materials intended for role-playing, but are products that are sold at a DIY stores.

Besides from this mapping, the report also provides laboratory analyses of a number of products. The analyses comprise a study of the content of the products and also testing through simulated production of home-made latex weapons.

Ready products

Figure 1 shows the estimated sale per item in 2005. The figures are the result of interviews with producers and distributors.

Figure 1: sale of products for role playing

Product type	Amount	Product type	Amount
Weapons (swords, clubs etc.)	30.000	Latex wounds, scars and noses	2.500
Metal armours	500	Latex teeth	1.250
Armour components	10.000	Vampire's teeth	300
Leather armours	2.500	Wine skins	3.500
Armour components	10.000	Skin glue	8.000
Peasant's coats and coats	3.500	Glue remover	1.000
Latex masks	1.000	Artificial blood	500
Latex ears	15.000	Tooth colouring	Few

Make-up is also a commonly used product, but this was described in an earlier mapping (Mapping of chemical substances in consumer products No. 5 2002) and is not part of this project.

Through visits to the distributors, declarations have been mapped, and product data sheets have been collected for the products that were selected for the survey. The chemical content was examined in a number of these products and by their CAS-numbers these were examined for risk components on the list of dangerous substances at the EU chemical database at EBC (European Chemical Bureau)

A data sheet was drawn up for each of these product and these were handed over to the Environmental Protection Agency. The report contains unnamed parts of these data sheets.

Laboratory analyses were conducted on the following ready products:

Latex masks

Two different products were analysed for the exposure of MTB (2-mercapbenzothiazel) to people through sweat. MTB is commonly used as an accelerator in the production of latex. MTB may cause allergic reactions in people, which is why the Environmental Protection Agency wishes to test the masks for migration of the substance.

Cast-solid latex masks carried during role plays were also analysed for volatile organic compounds (VOC) and semi volatile organic substances (SVOC).

Neither MTB, nor VOC/SVOC was detected in any of the masks.

Skin glue

Skin glue contained in a kit consisting of latex ears and skin glue was selected. The glue did not have a specific declaration and a data sheet was not accessible.

The content of the glue was analysed for solvents, VOC and SVOC (volatile and semi volatile organic substances). Three different solvents in various amounts and 14 VOC/SVOC variants above the detection limit were found.

Wine skins

The inner waterproof coating was analysed. The material was identified as PVC softened by the phthalate DEHP. Though determination in duplicate the content was estimated to be 22-25% (percent by weight)

It is not the purpose of this project to evaluate the results of the mapping and analyses from a health perspective.

Home-made weapons

During the past 5 years, home-made role-play weapons have developed from being fairly primitive weapons made of sleeping pads and duct tape into advanced latex weapons. The home-made weapon activity is a central feature of this report, partly due to its popularity and partly due to these weapons' possible content of dangerous materials, and it is a field which sees a great deal of experiments in order to reduce the price and increase the quality in the competition with the ready-made weapons.

Through interviews with active role players, distributors and role-play clubs, the materials typically used in the home production of role play weapons have been mapped. Furthermore, questionnaires distributed in youth centres were used in order to reveal how and under which circumstances the production takes place.

The result of the survey does not provide a complete mapping of the amount of latex weapons produced in youth clubs. The survey revealed a production of around 15-20.000 per year, but it should be considered that maybe only one third of the youth clubs in which latex weapons are produces have filled in the questionnaire (those that did not return the questionnaire were randomly checked), and the amount of weapons produced may therefore be much higher.

The most commonly used materials are:

- Glass fibre sticks (core)
- Plastic foam (forming the weapon)
- Contact glue (gluing plastic foam pieces together)
- Colour toner (ground colouring of latex)
- Liquid latex (coating)
- Paint (decoration of the weapon)
- Silicon (protective surface)

Most of these groups of material have a wide selection of products. Commercial producers and distributors of role-play equipment, who are often great role play fiery souls themselves, are aware that they may cause possible health hazards, and products that are assumed to be of less risk are selected, e.g. water-based contact glue, latex with a low content of ammonia and non gas propellant containing silicone. However, the survey among youth clubs shows that these often shop at the local DIY stores and the like. Silicon sprays intended for protection of rubber lists in cars for finishing weapons is an example of a product shopped here.

In the institutions, the products are handled in various ways. In some institutions, production takes place with the windows shot, and in others, it is done outside. Only a few institutions have the right ventilation. The institutions' own idea of what may be dangerous also varies. Only a very few of them consider themselves to have a high knowledge of the dangers involved in this field of production and generally, there is a wish for more information on what to be aware of when producing role-play weapons.

Two laboratory analyses were conducted with the purpose of testing whether the way the materials are handled during home production may cause an undesired effect.

The first test was a simulation of the application of latex to a weapon. Two tests were carried out with different latex products containing dissimilar amounts of ammonia. The air in the breathing zone was analysed for ammonia, nitrosamines and the organic substances VOC and SVOC.
The analyses revealed that there was a considerable difference in the vapour of ammonia between the two latex samples (factor 10), while no vapour from nitrosamine was registered. Various VOC and SVOC vapours were registered in both samples.

The second analysis was a simulation of sanding of plastic foam to examine the extent to which a person is exposed to slip when the plastic foam is sanded with fine sand paper. The test showed, however, that the slip did not rise to the air, but dropped to the table. No considerable amount of slip was detected in the breathing zone.

An evaluation of the health perspectives is not part of this project.

Sammenfatning og konklusioner

Miljøstyrelsen har ønsket at få kortlagt produktområdet for live rollespil, herunder hvilke typer materialer der anvendes, når børn og unge selv fremstiller rollespilsudstyr. Udstyr omfatter våben, dragter, kunstige ører/næser, masker mm.

Live rollespil er i løbet af få år blevet en udbredt hobby blandt børn og unge. Det anslås, at op mod 100.000 børn og unge (langt overvejende drenge) i alderen 8-18 år i løbet af et år vil være aktive rollespillere i et eller andet omfang – og at næsten alle drenge på et tidspunkt i deres barndom/ungdom er involveret i hobbyaktiviteten.

I takt med udviklingen fra niche til almindelig børnefritidsaktivitet er der opbygget et marked for udstyr og tilbehør til live rollespil. Branchen er præget af pionerånd, og først inden for de sidste par år er store legetøjskæder og supermarkeder kommet med.

CASA har via besøg hos danske producenter og forhandlere af udstyr til live rollespil samt undersøgelse af hjemmesider kortlagt typer og mængder af de færdige produkter, som markedsføres eller anvendes til rollespil. Derudover indgår materialer og processen omkring hjemmelavede produkter i kortlægningen. Målet med kortlægningen har været at få overblik over, om der indgår materialer, som kan være miljø- og sundhedsmæssigt betænkelige.

En stor del af det hjemmelavede udstyr produceres i SFO'er, fritidshjem og klubber. I projektet indgår derfor en undersøgelse af, hvor udbredt det er, hvad det er for materialer, der anvendes til det hjemmelavede udstyr (primært forskellige former for våben), samt hvilke metoder og procedurer der typisk anvendes i bl.a. fritidsordningerne. Hovedparten af de materialer, der anvendes til hjemmelavede rollespilsvåben, er ikke produkter, der oprindeligt er tiltænkt rollespil, men er produkter, der forhandles via f.eks. byggemarkeder.

Ud over kortlægningen indgår der i projektet en laboratorieanalyse af en række udvalgte produkter. Disse analyser har omfattet undersøgelser for konkret indhold i produkter samt forsøg, hvor der simuleres en situation under egenproduktion af latexvåben.

Færdige produkter

Via interview med producenter og forhandlere er der udarbejdet en anslået styk-omsætning i 2005, som fremgår af figur 1.

Figur 1: Omsætning af produkter til rollespil

Produkttype	Antal	Produkttype	Antal
Våben (sværd, køller mv.)	30.000	Latexsår, -ar og -næser	2.500
Metalrustninger	500	Latextænder	1.250
Enkeltdele hertil	10.000	Vampyrtænder	300
Læderrustninger	2.500	Drikkeskind	3.500
Enkeltdele hertil	10.000	Hudlim	8.000
Kofter og kapper	3.500	Limfjerner	1.000
Latexmasker	1.000	Kunstigt blod	500
Latexører	15.000	Tandfarver	Få

Sminke indgår også som hyppigt anvendt produkt, men dette er behandlet i en tidligere kortlægning (Kortlægning af kemiske stoffer i forbrugerprodukter nr. 5 2002) og indgår ikke i dette projekt.

Ved besøg hos forhandlere er der kortlagt deklarationer og indhentet produkt-datablade for de produkter, vi har fundet og udvalgt i butikkerne. En række af produkterne er herefter nærmere vurderet for indhold af kemikalier, og via CAS-numre er disse tjekket for risikosætninger via Listen over Farlige Stoffer samt EU's kemikaliedatabase hos ECB (European Chemical Bureau).

For hvert produkt er der udarbejdet et datablad, som er overdraget til Miljøstyrelsen. I rapporten er et anonymiseret uddrag heraf medtaget.

Der er udført laboratorieanalyser på følgende færdige produkter:

Latexmasker

To forskellige produkter er blevet undersøgt for, i hvilket omfang personer via sved kan udsættes for MBT (2-mercaptobenzothiazol). MBT er en ofte anvendt accelerator i produktionen af latex. MBT kan fremkalde allergiske reaktioner hos mennesker, hvorfor Miljøstyrelsen ønsker at få testet maskerne for migrationen af stoffet.

Derudover undersøges for flygtige organiske forbindelser (VOC= Volatile Organic Compounds) semi flygtige organiske forbindelser (SVOC = semi volatile organic compounds) fra helstøbte latexmasker, som bæres under rollespil.

Der blev ikke påvist afgivelse af MBT eller VOC/SVOC i nogen af maskerne.

Hudlim

Der er udvalgt en hudlim, som er indeholdt i en samlet pakke med latexører og limtube. Der var ikke en specificeret deklaration for limens indhold på emballagen, og et datablad har ikke kunnet fås.

Limen er undersøgt for indhold af opløsningsmidler og for VOC og SVOC (flygtige og semiflygtige ekstraherbare organiske stoffer). Der blev konstateret 3 forskellige opløsningsmidler i varierende koncentrationer samt 14 VOC/SVOC varianter over detektionsgrænsen.

Drikkeskind

Det er undersøgt, hvad den vandtætte belægning inderst består af. Materialet blev identificeret som PVC, der er blødgjort med phthalaten DEHP. Indholdet af DEHP er ved dobbeltbestemmelse bestemt til 22-25 % (vægtprocent).

Det indgår ikke i projektet at foretage en sundhedsvurdering af de fundne resultater fra kortlægningen og analyserne.

Hjemmelavede våben

I løbet af de sidste 5 år er hjemmelavede rollespilsvåben gået fra at være relativt primitive våben af liggeunderlag med gaffatape til at være mere avancerede latexvåben. Aktiviteten med hjemmelavede latexvåben er central i rapporten. Dels pga. udbredelsen, dels fordi der indgår mulige betænkelige materialer, og området er udsat for en del eksperimenter med henblik på at reducere prisen eller at øge kvaliteten i konkurrencen med de færdigkøbte våben.

Via interview med aktive rollespillere, forhandlere og rollespilsforeninger er der kortlagt, hvilke materialer der typisk anvendes ved egenproduktion af rollespilsvåben. Endvidere er der via en spørgeskemaundersøgelse blandt institutioner søgt afdækket, hvordan denne produktion foregår og under hvilke forhold.

Det er ud fra undersøgelsen usikkert, hvor mange latexvåben der produceres i institutionerne. Umiddelbart kan der ud fra projektets spørgeskemaundersøgelse estimeres en produktion på 15-20.000 våben på et år – men tages der højde for, at måske kun en tredjedel af de institutioner, hvor der foregår produktion af latexvåben, har svaret på spørgeskemaet (jf. stikprøve blandt ikke besvarede), kan det således være langt flere våben pr. år.

De mest anvendte materialer er:

- Glasfiberstænger (kerne).
- Skumplast (grundformning af våben).
- Kontaktlim (sammenlimning af skumplaststykker).
- Farvetonere (grundfarvning af latex).
- Flydende latex (belægning).
- Maling (dekoration af våbnet).
- Silikone (beskyttende overflade).

Der er et stort og varieret produktudbud inden for de fleste af disse grupper. Blandt producenter og forhandlere af rollespilsudstyr – som ofte selv er ildsjæle forankret i rollespil – er man opmærksomme på mulige sundhedsfarer, og der forhandles varianter, som formodes at være mindre risikobetonede. F.eks. vandbaseret kontaktlim, latex med lavt ammoniakindhold og silikone uden drivgasser. Imidlertid viser undersøgelsen blandt fritidsordninger, at man her oftest køber ind i det lokale byggemarked o.l. F.eks. bruges silikonespray, der er beregnet til bl.a. beskyttelse af gummilister på biler, til efterbehandling af våben.

Omgangen med produkterne under fremstillingen i institutionerne er meget varieret. Nogle steder foregår det for lukkede vinduer, andre steder går man udendørs, og kun få har egentlig udluftning. Institutionernes egen vurdering af, hvad der kan være risikobetonet, varierer også meget. Kun få steder vurderer man at have en høj viden om risici ved produktionen, og der er

generelt et stort ønske om mere information om, hvad man bør være opmærksom på.

Der er udført to laboratorieanalyser, som har til formål at efterprøve, om omgangen med materialerne under egenproduktionen kan indebære en uønsket påvirkning.

I det ene er der simuleret en situation, hvor en person påfører latex på et våben. Der er gennemført test med to forskellige latexprodukter med angiveligt forskelligt ammoniakindhold. Luften i åndedrætszonen er analyseret for ammoniak, nitrosaminer og de organiske stoffer VOC og SVOC.

Analyserne viser, at der er stor forskel i afdampningen af ammoniak fra de to latexprøver (faktor 10), mens der ikke blev påvist afdampning af nitrosaminer. Der var konstateret forskellige VOC'er/SVOC'er i afdampningen fra begge prøver.

Den anden analyse simulerede slibning af skumplast for at undersøge, i hvilket omfang personer udsættes for slibestøv, når skumplast slibes med et fint stykke sandpapir. Testen viste imidlertid, at slibestøvet ikke hvirvles op i luften, men falder ned på bordet. Der kunne da heller ikke påvises slibestøv af betydning i luften i åndedrætszonen.

En sundhedsvurdering af resultaterne indgår ikke i dette projekt.

1 The extension of role play

Live role play is a leisure activity which, according to actors in the field, has seen a rapid growth within the past years and which is expected to continue to grow.

This is seen from the number of children and youth among the consumers of the products within role playing and the number of role play societies and youth centres conducting role play.
The number of active role players

Role-play actors estimate that within a year, as many as 100.000 children and youth (mostly boys) between 8 and 18 will to some degree participate actively in role playing – and almost all boys will at some point in their childhood/youth be involved in this activity. It is estimated that the number is increasing.

An estimated 10.000 of these are members of actual live role-play societies, while the main part of the 100.000 conduct this hobby in their youth centres or in their leisure time.

As part of this project, a questionnaire was randomly distributed among youth centres (10% of Danish SFO's and youth centres).The result of the questionnaire survey revealed that role-play activities take place in at least every 5 youth centre and that an average 15-20% of the children here are involved in these activities.

1.1 Live role-playing, this is how it works

Live role-playing is a play without a manuscript, often with a medieval theme. A group of actors define a common background world where the play takes place. The actors then, or in co- operation with the organizers, then define a role for themselves. The roles are then given goals, personalities, duties and assignments. When the game begins, it is then up to the individual players to develop and be that fictive person and decide how the story is to develop. Throughout the year, several events take place within live role-play. Here, children and youth from the age of 10 meet - and a few adults. The role-play world is generally driven by voluntary labour, and it is voluntary unpaid workers that arrange the role play events.

In live role-play, there are a number of characters that the participants can play. Each of these characters has its own getup and equipment. The getup is usually worn throughout the play.

Typical role-play characters are:

- Orcs: wear masks or have latex ears and painted green face. May have latex teeth.
- Elves: have latex ears (various colours, depending on the type of elf) and drawings in the face.
- Hobbits: have latex ears and painted eyebrows.
- Goblins: have latex noses and ears and are painted in the face.

- Humans: there are no criteria for humans, but they may have scars or wounds
- Dwarfs: have beard

Less typical role-play characters are:

- Trolls: have latex ears and noses and are painted, e.g. blue. May have things glued to their hands
- Nymphs: painted, signs in their faces and latex ears
- Wolf people: painted grey and have gloves with claws and gloves with claws attached with latex.
- Satyrs: have latex horns attached to their foreheads and hoofs in the shoes
- Golems: have large getups the shape of a stone, but may also imitate mud or fire

A role-play event typically lasts on day from 10am to 3pm, but may also last for a whole weekend. The participants are therefore dressed up for many hours at a time, where ears and noses are attached all day, whereas masks are often taken off, since they are to hot to carry for a whole day.

Besides from the getup, many participants have role-play weapons. Before the event is started, all weapons are security checked by the event markers. Weapons typically comprise daggers, swords, bludgeons and axes. The weapons are made of latex and are either bough ready-made or are home-made. The home-made weapons may be made of sleeping pads and duct tape (duct-tape weapons).

An authentic environment is considered very important at role-play events. This applies to both getup and equipment. This means that for instance weapons made of different tape types or the like are not welcome.

Weapons and getups are not only used at role-play events, but are also part of children everyday life. During the past years, role play has emerged in the youth centres. Here, they produce weapons and equipment and perform live role-playing.

2 Products and material

During the past few years, the market for role-play equipment has seen a rapid growth in Denmark.

The breakthrough for this group of products followed in the wake of the film-trilogy “Lord of the Rings” which was showing at the movies in December 2001, 2002 and 2003.

The products and material used by role-players partly overlap those of theatres and movies. Costumes, make-up and various props are used.

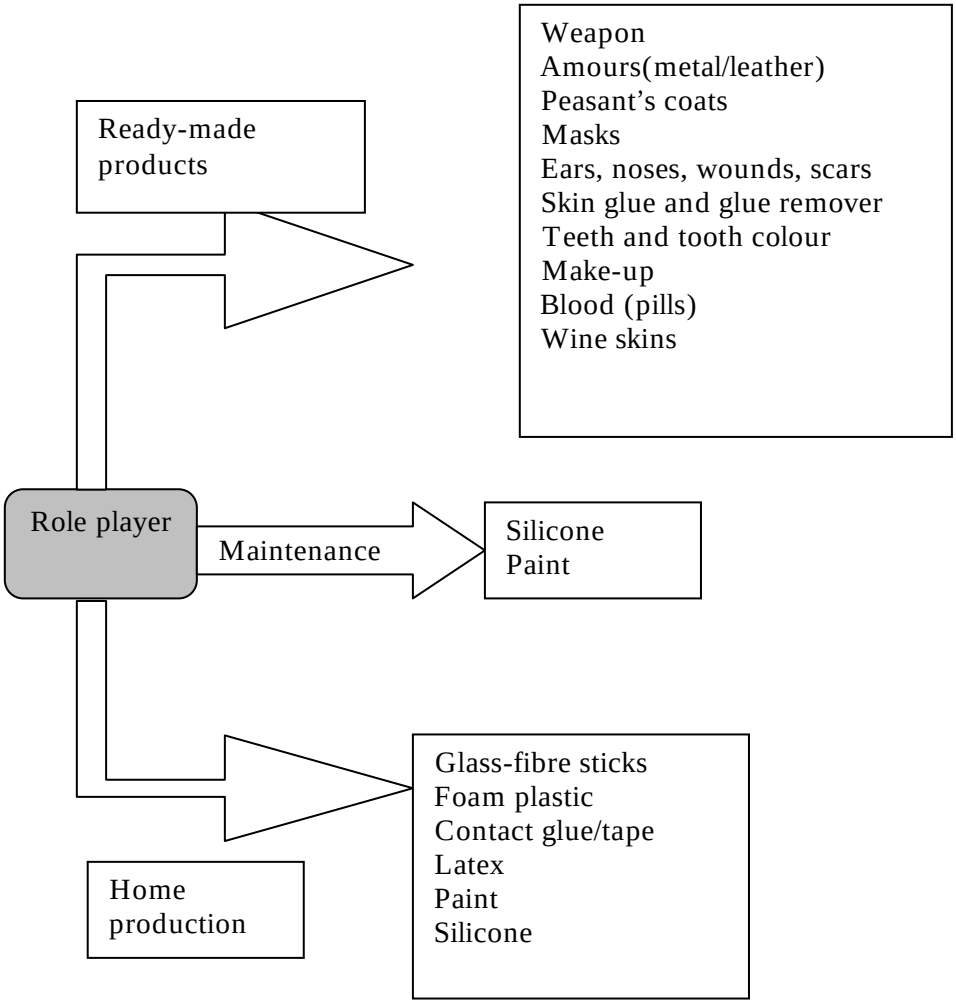
In the past, it was popular among children to produce weapons made of bamboo sticks and foam plastic wrapped with duct tape. However, concurrent with this hobby becoming increasing popular, a whole market of ready-made products has emerged. Parallel to this, a new form of home production has emerged, seeking to imitate the great-looking ready-made products.

There are 3 way of potentially being exposed to chemical substances:

- During home production of equipment
- Through use of ready-made and home-produced products
- Through maintenance of ready-made and home-produced products

Below is an illustration of the access to possible problems:

Figure 2:



Home production of peasant's coats, amours and other equipment also takes place to a certain extent, but this report focuses on materials used in the production of weapons.

The mapping has been carried out through visits to distributors and producers of role-play equipment.

They have all been asked to provide estimated figures of the sale of various products based on their own experience and knowledge of the market in Denmark. The results are summarised below.

Year by year, the sales of role-play products have doubled, but it is estimated by the actors in the field that sales are beginning to level out. Several actors believe that sales in 2006 will double that of 2005.

Interviews with the actors were conducted through April-May 2006.

2.1 Ready-made products

Ready-made role-play products are distributed through specialist role-play shops in the cities, role-play departments in e.g. toy stores and book stores, and through cheap offers in supermarket chains.

Role-play stores primarily distribute equipment produced in Denmark and also some produced in Germany. The supermarkets import equipment that is produced in e.g. China. A number of special products as e.g. skin glue and latex toner are either produces in Denmark or imported, whereas others, as e.g. artificial blood, are, without exception, imported.

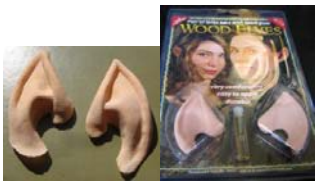
Some typical product areas, which are also used for live role-playing, are described in a previous corresponding report. This covers make-up, which is therefore not described in the present survey.

The Figure below indicates and estimated annual sale (in 2005) of the various product areas. Furthermore, it is indicated with a ☑ whether an evaluation of the chemical content will be described later in the report.

The photos are randomly selected examples of the illustrated product group.

Figure 3: An overview of products and sale in 2006

Random examples of the products	Sales	Potential problem areas
	**Latex weapon** Estimated sales are 30.000 weapons, comprising swords, bludgeons and other striking weapon These weapons are build around a core of glass fibre, foam plastic, latex, paint and varnish.	It is estimated that use of ready-made weapons does not cause any problems to the health However, weapons get worn by use and it is common to maintain these by adding silicone – see under silicone in the Figure
	**Metal armour** 500-600 metal armours are sold per year. Normally, single parts are sold, such as arm or shin guards. Sales of these are an estimated 10.000.	It is estimated that use of metal armours does not cause any problems to health other than allergies. Depending on the type of metal, there is a risk of liberation of nickel, which may cause allergy. Also, various products are used for maintenance. These have not been tested.
	**Leather armours** Annual sales of leather armours are estimated to be 2.500. Primarily, single parts are sold. Sales of these are an estimated 10.000	It is estimated that the use of leather armours worn on clothes does not cause any problems to the health other than allergies. Metal rivets may contain nickel, which, if liberated, may cause allergy.

		Also, various products are used for maintenance. These have not been tested.
	**Peasant's coats and capes** Annual sales are 3-4000.	It is estimated that the use of these garments does not cause any problems to the health
	**Latex masks** Annual sales are approx.1.000 rubber masks and a corresponding number of rubber helmets. The masks are made of latex, which has been painted	Latex can liberate substances, which may be absorbed through the skin or inhaled. There is a risk of acquiring latex allergy (according to the Danish National Board of Health, approx 1% of the population has latex allergy) Will be evaluated later ☑
	**Latex ears** Annual sales are approx. 15.000 artificial latex ears. The ears are glued to the skin. Various kinds of glue are used. The glue is either sold with the ears or separately	There is a risk of acquiring latex allergy – look above under latex masks for details. But besides from that, it is presumed that the use of latex ears does not cause any problems to the health. The kit glued may possibly contain suspicious substances. Will be evaluated later ☑

	**Wounds, scars and noses** Other latex products are sold, such as wounds, scars and noses. These are glued to the body. Annual sales are 2-3000.	There is a risk of acquiring latex allergy- look above under latex masks for details. Besides from this, it is presumed that the use of latex ears does not cause any problems to the health. Glue will be examined later☑.
 	**Artificial teeth** Annual sales are 1000-1500 sets of art artificial teeth in the form of rubber gums. Latex teeth are coloured	During use, substances from the colour and latex may be liberated to the skin or orally through the saliva. There is a risk of acquiring latex allergy- look above under latex masks for details.
	**Vampire's teeth** A small amount is sold annually (approx 300) which are glued to the teeth with the accompanying glue paste	Glue paste See comments under latex ears Glue will be examined later☑.
	**Wine skins** Various accessories are on the market. The most popular one is the wine skin. Annual sales are approx. 3000-4000. The number may be larger, since this is a very popular item which is sold more widely than the other items. A wine skin consists of a container covered by skin	Potential health risks depending of what material the container is made of. One distributor informed that the membrane is made of latex To be examined later☑.

	**Skin Glue** Various types of glue are sold for attaching artificial ears, noses, wounds and scars. Sales are estimated to be around 7-10.000 units	Skin glue is sold in solvent-based and water-based varieties. The content of skin glue will be examined later ☑
	**Glue remover** For removing glue after use. It is estimated that max sales are 1000 units.	Normally, distributor advise against the use of skin glue, since allergic reaction after use is not uncommon The content of glue remover will be examined later ☑
	**Artificial blood** Various types of artificial blood product are sold. These are either for application to the skin or pills to be chewed. It is estimated that max. sales are 500 units.	The content of the blood products will be examined later ☑
	**Tooth varnish** A very small amount of tooth varnish is sold	The content of tooth varnish will be examined later ☑

2.2 Products for home production and maintenance

Home production comprises both activities at home and in youth centres and SFO's, where it has become a popular educational activity to produce weapons and other equipment for role playing.

The materials for this are bought from many different sources, partly from specialisy role-play shops and DIY centres and partly from special suppliers. The products are often commercialised for other purposes.

Actors estimate that weapon production is an activity that takes place in every third SFO and in almost all youth centres. A survey based on questionnaires, which is part of this project, has revealed that at least every 5 institution conduct this activity. A random check on those who didn't return the questionnaire revealed that possibly, the activity takes place in every second institution.

Earlier on, production of duct tape weapons was popular, but in the wake of the film-trilogy "Lord of the Rings" which had its opening in December 2001, a rapidly growing market has emerged with e.g. Danish produces realistic latex weapons. This meant that primitive duct tape weapons were no longer welcome in role-play circled, and therefore, the hobby of home production of latex weapons spread fast. It has become a very popular activity in institutions, where a person skilled within role playing and latex weapons is often in charge of the area. Besides from weapons such as swords, bludgeons, axes etc, other latex products are also produces, such as ears and teeth, however to a small extent.

Below is a description of the production of a sword, but the process is almost the same for all latex products. Smaller item, such as ears, are cast in a mould into which latex is poured in several turns.

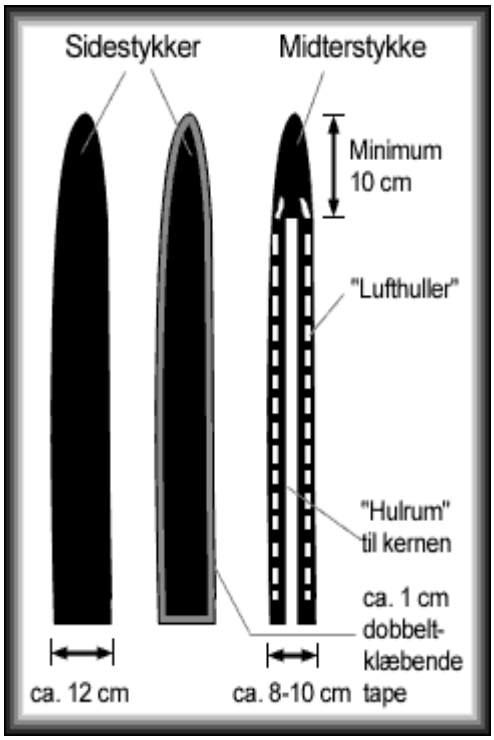
2.2.1 How are home-made latex weapon produced?

There are various methods of production. The following description is made on the basis of visits to clubs, interviews with children and studying of various manuals that are displayed on e.g. the role-play societies' homepages.

The following materials are used:

- Latex (natural latex or the like)
- Glass fibre, bamboo and tubes
- Sleeping pads or other foam materials, or possibly pipe isolation
- Possibly fabric or sheeting in neutral colours
- Colour pigment for latex and/or spray paint
- Double-sided adhesive tape and/or contact glue

Figure 4: Drawing of materials for a sword. Source: www.live-rollespil.dk.



Side pieces, middle piece, minimum 10 cm, air holes, air space for the core, ca. 1 cm double-sided adhesive tape

Summary of the method of production

1. The blade is cut out from a sleeping pad. The middle piece is cut out leaving room for the core. This is done by cutting an air space. In order to make the weapon soft, the middle piece should also have air space.
2. The core consists of glass-fibre stick or of a tube with a bamboo stick inside. Sticks or pipes are cut to fit the length of the air space and the shaft together.
3. The core is attached to the sleeping pad, either with double-sides adhesive tape or contact glue. The shaft is attached in the same way. The shaft is often made of a piece of pipe isolation or sleeping pad cut to fit.
4. Then the fluid latex is applied. The latex is added a latex toner before it is applied to the weapon.
   Latex may be applied in different ways. Here are a few examples:
   - By painting the latex on the foam plastic with a brush
   - By dipping your fingers into latex and apply it with your fingers
   - By dipping the weapon into a vat of latex
   - By dipping fabric into latex and smooth it on the weapon
5. Latex is applied in many layers, and the weapon needs to dry between each application. This is done by hang drying it. The process is identical to that of dipping candles. A hair drier or ventilation may be used in order to speed up the process.
6. The shaft may be covered in leather, and the weapon may be decorated with stones, lace, or leather. Some also suggest that parts of the weapon are spray painted.

7. Latex is finished with silicone, which is sprayed on when the weapon is ready and after each use. Or the weapon may be finished with talcum powder.

The above is a very overall description, and there are several variants: Some make patterns in the sleeping pads with a copper bit, some grind the sleeping pad in order to remove all impurities, and others heat the sleeping pad in order to melt the layers and thus remove all transitions and so forth.

During the study, we came across home pages that recommended the use of substances that are illegal in Denmark. For instance, the use of isoflex as a finisher in order to obtain a harder and more durable surface than with silicone. Isoflex is very toxic and may not be sold in Denmark.

“Your weapon may also be protected with a latex varnish. It is called isoflex and is very expensive, but you need only a small amount for each weapon. It may be imported from USA where it is produces, or try buying it from on of the latex-weapon producers.

The above statement was found on a home-page that apparently is a few years out dated. It is illegal to buy toxic or very toxic substances from the internet.

2.2.2 Applied materials

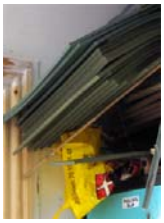
In order to uncover what materials are being used when producing weapons at home, interviews with the LLR (the National Association of Live Role-player) have been conducted and literature and homepages guides to the production of weapons and other equipment have been studied.

The figure below is an overview of the most typical products used in preparing role-play equipment. The figure displays types of products as well as tangible products that we have come across. Materials for home-made role-play weapons are not connected to a specific commercialised product group. You may find some products in specialist shops, but the products may also be procured through other channels.

Therefore, it is generally difficult to provide an educated estimate of the consumption, since these materials may be procured from specialist shops and a range of other shops, e.g. DIY centres, supermarkets, paint dealers, hardware dealers and shops with home equipment. Here, the products are not specifically sold for role-play purposes, and the dealers have no knowledge of the share that is sold for this purpose.

In the figure below, it is indicated with a ☑ whether an evaluation of the chemical content will be described later in the report. For a number of products, it is not possible to estimate the sales to role-play purposes, since these products are sold for many other purposes, as mentioned above.

Figure 5: A summary of products used in the production of weapons

Random examples of the products	Description	Potential problem areas
	**Glass-fibre stick** A round glass fibre stick is used as the core in swords and another long weapon. They are sold in specialist role-play shops as well as in DIY centres. Glass-fibre sticks have replaced the bamboo stick as the core of the weapon, and the main part of home-made weapon have a glass-fibre core	When the glass-fibre stick is sawed to adjust the length, glass-fibre dust is released to the air. The health aspect of this has not been further studied, since it is estimated not to have any consequences to the health of the child. Furthermore, the release of dust may be prevented by pouring water during the sawing
 	Foam plastic. Foam plastic is used to shape the weapon. Sleeping pads are typically used, which are cut and attached to the glass-fibre stick with glue and the wood handle. Various types of foam plastic is used	After being cut, the foam plastic is possibly grinded in, which releases dust to the air. Possible removal of foam dust with heat (ironing) which releases vapour to the air. A possible decoration of the foam with a copper bit, which also release vapour to the air Will be evaluated later ☑.
 	**Contact glue** Normally, several layers of foam plastic are used, which are glued together. Here, contact glue is typically used, which may be water-based or solvent-based. Alternatively, double-sided adhesive tape may be used	Glues base don solvents contain unhealthy substances. The content of some of these products have been mapped. Will be evaluated later ☑. Tape has not been examined, since it is estimated not to have any consequences to peoples health

   	**Liquid latex** The basic form of the weapon is covered in liquid latex (natural latex). Almost everybody use the same basic product from Thailand, which is then decanted to own products by the dealers. Various variants of natural latex are sold with a varying content of ammonia. It is estimated that annual sales are around 3000 Litres.	Latex contains ammonia and possibly nitrosamines and VOC, which are released during the production of the weapons. Will be evaluated later ☑. Some children may have latex allergy (according to the Danish National Board of Health, approx 1% of the population has latex allergy)
   	**Latex toner** Latex toner is added to latex to provide a basis colour. Toners from specialist role-play shops as well as from traditional paint dealers are used. Apart from the marketed latex toners, colours for painting little role-play figures are also used. The sales are estimated very differently by the actors and vary from 1000 to 12000 units, which again is between 50 and 600 litres.	A number of the latex toners will have the content of substances examined ☑.

 	**Colour** The almost ready weapon is possibly painted to give it an extra good look. Various colours are used for this, possibly spray paint	A few colours will have the content of substances examined. ☑. .
    	**Silicone** The weapon is finished with a silicone layer which for one gives the weapon a shine surface and also protects the latex and colours during use. The weapon, also ready-bought, is typically maintained by applying silicone after each use. There are 3 main types: Spray cans sold for role-play purposes, spray cans marketed for maintenance of cars, and containers with a mechanical pump solution. Silicone is typically sold together with a ready weapon. Besides from this, it is used in home production. Estimated sales are around 30.000 units.	The content of substances of the various silicone sprays will be examined later☑.

3 Chemical substances in products

3.1 An summary of the specific products

A number of products were selected for a closer examination of the content of chemical substances. The products in question are those marked with a ☑ in the previous chapter.

It should be noted that the stated descriptions on marking of the products in not an expression of possible insufficient marking. Even though a product contains a substance which is classified with one or more risk assessments, there may be reasons why the product is not marked. The marking is e.g. depending on the concentration of the substance in the product, and there are special regulations for small packaging.

For each product the following is stated:

- The nationality of the producer.
- How the product is sold.
- The content of substances (often acquired from a safety data-sheet for the product, but possibly also from the producers homepages and from the declaration of the product). If possible, the CAS-number of the substances is indicated.
- Classification of the content of substances (for substances having a risk assessment, these have been indicated). All substances have been checked in LOFS (the List of Dangerous Substances, where possible classifications may be found) through the CAS-number. Also the EBC (European Chemical Bureau) was consulted (view hhtp//ecb.jrc.it in the ESIS database). EBC handles the central registration of chemical substances in the EU. If there are discrepancies between the two lists, this is indicated in the figure. In some safety data-sheets, other risk assessments are also stated, and it is indicated if there are discrepancies between these sources. Annex C is a list of danger markings, risk assessments and remarks, since these are not explained in the figure.
- Marking of the product – here, the danger marking on the specific products are listed.
- In some places, a note has been added with further explanations.

Figure 6: summary of products in home-production

1st product type	Latex
Producer	Producer from Malaysia
Dealer	Several role-play shops
Content, cf. the safety data-sheet etc.	CAS: 9006-04-6 Natural latex > 95 %. CAS: 7664-41-7 Ammonia The producer's safety data-sheet does not mention the content of NH_3. Through other sources (dealers) we have been informed that the content is 0.6%.
Classification of CAS: 7664-41-7.	R10 T; R23 C; R34 N; R50 In concentrations of 0,5 - 5 %, is the following classification: Xn; R20 Xi; R36/37/38.
Marking of the product	The bottle has the following text: "Contains ammonia, should only be used in ventilated areas". Also, it warns that latex may cause allergy.
Note	A number of latex dealers decant the product from large barrels to smaller containers. Often, these do not have An information label. Also comes in concentrations of 0.3% NH_3.

2nd product type	Latex
Producer	Danish producer
Dealer	Sold in e.g. role-play shops
Content, cf. the safety data-sheet	CAS 1336-21-6 Ammonia < 0.2%
Classification of CAS: 1336-21-6	C; R34 N; R50 No classification for concentrations of <0.2 %
Marking of the product	None. The product is sold in bottles with no label
Note	The dealers decant the product from large barrels to smaller containers. On request, the dealer provided the label of the barrel. The label referred to a safety data-sheet.

3rd product type	Silicone spray
Producer	Produced in the EU.
Dealer	Tot stores
Content, cf. the safety data-sheet of 27-01-2004	CAS: 64742-49-0 Naphta, treated with hydrogen, volatile 25-50 % CAS: 74-98-6 Propane 10-25 % CAS: 106-97-8 Butane 10-25 % CAS: 75-28-5 Isobutane* 10-25 % *Contains ≤ 0.1 % butadiene
Classification of CAS: 64742-49-0 Naphta, treated with hydrogen, volatile	At concentrations ≥ 10 %: Carc2; R45 Xn; R65 Annotations : Ae, H, P, 4. If the substance contains less than 0.1 % benzene, Carc2;

	R45 is not relevant, Xn; R65 not used for aerosols.
Classification of CAS: 106-97-8	F+; R12.
Classification of CAS: 75-28-5 ≤ 0,1 % butadiene	F+; R12.
Classification of CAS: 74-98-6	F+; R12.
Marking of the product	The label states: "Should be used outdoors". Is marked with the following danger symbols: Xi causing local irritation F+ Highly inflammable N Damageable to the environment Furthermore, MAL-code: 3-1 is stated

4th product type	Silicone spray
Producer	Produced in the EU.
Dealer	Sold through role-play producer in role-play shops.
Content See safety data-sheet:	CAS 60828-78-6 2,6,8-trimethyle-4-nonyloxy-polyethylene-oxy-ethanole 2.0 %.
Classification of CAS 60828-78-6	Is evaluated according to safety data-sheet and classified as Xi; R36 R52/53. Is not recorded at LOFS.
Marking of the product	No information on the content

5th product type	Silicone spray
Producer	Danish producer.
Dealer	A wide range of dealers
Content	CAS 64771-72-8 n-paraffin (C10-C13) >75 %.
Classification of CAS 64771-72-8	Xn; R65.
Marking of the product	"Avoid inhalation of the aerosol fog. Keep away from children. The product is further marked with the symbol Highly inflammable. No information on the propellant

6th product type	Contact glue for foam plastic
Producer/importer	Produced in the EU, imported by role-play producers
Dealer	Sold in role-play shops
Content	The safety data-sheet indicates that it contains a 40 % solution of co-polymers, resins, emulsifiers and stabilizers. No names or concentrations are mentioned.
Classification	No information.
Marking of the product	No information.

7th product type	Contact glue for foam plastic
Producer	Produced in the EU.
Dealer	Sold through a Danish importer
Content	CAS 2634-33-5 1,2-benzisothiazol-3(2H)-on < 0.002 % CAS 68130-72-3 Polyglycolether, aromatic 1-2.5 % CAS 9010-98-4 Chloroprene rubber 25-50 % CAS 1314-13-2 Zinkoxide 1-2.5 %.
Classification CAS 2634-33-5	Xn;R22, Xi;R38-41, R43, N;R50
Classification	

CAS 68130-72-3	R52/53
Classification CAS 1314-13-2	 N;R50/53
Marking of the product	No marking

8th product type	Contact glue for foam plastic
Producer	Dansk Producer.
Dealer	A wide range of dealers
Content See safety data-sheet:	CAS 1330-20-7 Xylene < 30 % CAS 141-78-6 Ethyl acetate < 30 % CAS 64742-49-0 Naphta, hydrogen treated, volatile (< 0.1 % benzene) < 25 % CAS 1314-13-2 Zinkoxide < 1 % CAS 8050-09-7 Cholofonium < 0.5 %.
Classification of CAS 1330-20-7	R10, Xn; R20/21, Xi; R38 (at concentrations>= 20 %).
Classification of CAS 141-78-6	F; R11, Xi; R36, R66, R67.
Classification of CAS 64742-49-0	T;R45-65 (at concentrations >= 10 %).
Classification of CAS 1314-13-2	N; R50/53.
Classification of CAS 8050-09-7	R43.
Marking of the product	The product is marked with danger symbols for inflammable and unhealthy. Further, it is indicated that it "contains toluene. Hazardous if inhaled" MAL-code 4-3.

9th product type	Latex toner
Producer/importer	Produced in the EU, imported be role-play producer.
Dealers	Sold in role-play shops
Content	The safety data-sheet informs that the product consists of an aqueous solution with synthetic pigments, non-ionic and ionic surface-active substances, moisturizers and preservatives. Names or concentrations are not indicated.
Marking of the product	No marking or information label.

10th product type	Latex toner
Producer	Danish producer
Dealer	A wide range of dealers
Content See safety data-sheet:	CAS 55965-84-9 Solution of 5-chloro-2-methyle-4-isothiazoline-3-on and 2-methyle-4-iso-thiazoline-3-on (CMIT/MIT) < 9 ppm. (The preservative is Kathon).
Classification of CAS 55965-84-9	Depends on the concentration: Conc. ≥ 25 %: T;R23/24/25 C;R34 R43 N;R50/53 3 % ≤ Conc.<25 % : XN;R20/21/22 C;R34 R43 N;R51/53 2,5 % ≤ Conc.<3 % : C;R34 R43 N;R51/53 0,6 % ≤ Conc.<2,5 %: C;R34 R43 R52/53 0,25 % ≤ Conc.<0,6 %: XI;R36/38 R43 R52/53 0,06 % ≤ Conc.<0,25 %: XI;R36/38 R43

	0,0015 % ≤ Conc.<0,06 %: R43
Marking of the product	No information label or danger symbols
11th product type	**Latex toner**
Producer	Produced in the EU..
Dealer	Imported and sold in role-play shops
Content See safety data-sheet:	Pigment: 15.8 % Acrylic resin: 33.5 % Water (H_2O): 16.3 % Additives: 34.3 %.
Marking of the product	No information label or danger symbols

12th product type	**Latex toner**
Producer	Produced in the EU, imported.
Dealer	Sold in role-play shops
Content	Safety data-sheet has been ordered, but not received
Marking of the product	Nothing besides the CE marking

13th product type	**Latex toner**
Producer	Danish Producer.
Dealer	A wide range of dealers
Content	CAS 55965-84-9 A solution of 5-chloro-2-methyle-4-isothiazolin-3-on and 2-methyle-4-iso-thiazoline-3-on (CMIT/MIT) (Kathon) < 15 ppm CAS 251298-11-0 Oleylalcohol, ethoxylated, phosphated Na-salt 0-5 % CAS 157707-44-3 Alkylmonoethanolamide ethoxylate 0-10 % CAS 26264-05-1 Isopropylamindodecylbenzensulfonate 0-5 %c CAS 107-41-5 2-methyle-2,4-pentandiole 1-10 % CAS 9004-98-2 Oleylalcoholethoxylate 0-10 % CAS 9046-01-9 Polyethoxyethylentridecyletherphosphate 0-5 %. Further contains (no CAS-nr.): Alkylarylpolyglycolethersulfate, Na-salt 0-5 %. Caliumalkylphospherester 0-5 %.
Classification CAS 55965-84-9	T;R23/24/25 C;R34-R43 N;R50/53. (Depending on the conc. See type of product 10).
Classification CAS 251298-11-0.	According to the safety data-sheet it is classified as Xi;R36/38. Cf. LOFS, the substance is not classified.
Classification CAS 157707-44-3	According to the safety data-sheet it is classified as Xi;R36. Cf. LOFS the substance is not classified.
Classification	According to the safety data-sheet it is classified as

CAS 26264-05-1	Xi;R36/38. Cf. LOFS the substance is not classified.
Classification CAS 107-41-5	Xi;R36/38.
Classification CAS 9004-98-2	According to the safety data-sheet it is classified as Xi;R36/38. Cf. LOFS the substance is not classified.
Classification CAS 9046-01-9.	According to the safety data-sheet it is classified as Xi;R36/38. Cf. LOFS the substance is not classified.
Marking of the product	The product has a common information label for all colours. A MAL-code is indicated. For oxyd red, it is indicated that it contains dipropylene glycolmetyleter" MAL 1-1. For black, it is MAL 0-1. For other colours 00-1. In swedish it is further indicated to "Avoid inhalation of vapour/spray fog. At insufficient ventilation, use a sufficient breathing mask.

14^{th} product type	Latex mask
Producer	Danish Producer.
Dealer	Sold in role-play shops.
Content	Made of latex – unknown content.
Classification	
Safety data-sheet	No
Marking of the product	None

15^{th} product type	Latex mask
Producer	Produced in Cina, imported through Danish importer.
Dealer	Sold in supermarkets
Content	Made of latex – content unknown
Classification	
Safety data-sheet	No
Marking of the product	None.

16^{th} product type	Latex ears with skin glued
Producer	Produced in the EU.
Dealer	Sold in role-play shops
Content: according to the declaration on the product	The ears are made of latex. The glue contains: CAS: 9000-14-0 Copal (Copal rosin varnish), Rosin acrylate – unknown. Rosin soft – unknown. CAS: 64-17-5 Ethyl alcohol, (ethanol).
Classification CAS: 64-17-5	R11.
Marking of the product	An information label with a warning in English that it is inflammable and towards allergies to the content.

17^{th} product type	Latex ears
Producer	Danish role-play producer
Dealer	Role-play shops
Content	Latex.
Classification	None.
Safety data-sheet	No.
Marking of the product	None.

18th product type	Self-adhesive artificial scars and wounds
Producer	Produced in China
Dealer	In supermarkets as special offers
Content	Unknown.
Classification	None.
Note	A "test report" conducted by SGS Group in February 2006 is available, which investigates whether the EU regulations on toys are observed. This includes a test of the migration of heavy metals. The limit values were not exceeded.

19th product type	Skin glue
Producer	Produced in the EU.
Dealer	Is imported and sold in e.g. role-play shops
Content See safety data-sheet::	CAS 67-63-0 Isopropyl alcohol 71 %. CAS 97-88-1 Butyl methacrylate 24 %. CAS 8001-79-4 Ricinus communis 5 %.
Classification CAS 67-63-0	F; R11 Xi; R36 R67.
Classification CAS 97-88-1.	R10 Xi; R36/37/38 R43. Annotation D.
Marking of the product	Declaration of content, no danger symbols.

20th product type	Skin glue
Producer	Produced in the EU.
Dealer	Is imported and sold in e.g. role-play shops
Content See safety data-shee and cf. the information label on the product	CAS 64-17-5 Ethanol 50 %. CAS 25086-89-9 PVP/VA Copolymer. CAS 68648-38-4 PEG-75 Lanolin oil.
Classification CAS 64-17-5	F; R11.
Marking of the product	Declaration of content, no danger symbols.

21st product type	Skin glue
Producer	Danish producer.
Dealer	Not sold
Ingredients	Information not available
Marking of the product	Warning (in English):"Do not eat. If the product is consumed, drink water". "If case of eye contact, clean with water".
Note	The product was on display when CASA visited the producer, but according to the producer, it was only for internal activities.

22nd product type	Skin glue
Producer	Produced in the EU.
Dealer	Role-play shops
Ingredients, cf. the label :	CAS 64-17-5 Alcohol Denaturated. CAS 9000-14-0 Copal. CAS 8050-09-7 Colophonium (Resin). CAS 110-17-8 Fumaric Acid. CAS ? Colophonium Glycolester. According to the Safety data-sheet CAS 64-17-5 Alcohol

	Denaturated. The concentration is not indicated
Classification CAS 64-17-5	F; R11.
Classification CAS 8050-09-7	R43.
Classification CAS 110-17-8	Xi; R36.
Marking of the product	Inflammable (in a number of languages, except Danish).

23rd product type	Skin-glue remover
Producer	Produced in the EU.
Dealer	Sold in e.g. role-play shops
Content cf. the label **Content** See safety data-sheet:	CAS 64-17-5 Alcohol Denat. CAS 67-63-0 Isopropyl Alcohol. It is indicated that the substance is a mixture of ethyl- and isopropyl alcohol. Furthermore, the following R-assessment is indicated: CAS 67-63-0 2-propanol (Isopropyl Alcohol). The concentration is not indicated.
Classification CAS 64-17-5	F; R11.
Classification CAS 67-63-0	F; R11 Xi; R36-R67.
Marking of the product	"Sparsam anwenden. Längerer/Wiederholter kontakt kann Hautentfettung versuchen".
Note	Several dealers informed us that they have seen allergic reaction after the use of skin-glue remover (not necessarily this product). Most of the dealers informed us that they dissuade customers from using skin glue and recommend the use of soap and that the glue is rubbed off.

24th product type	Vampire's teeth
Producer	Produced in the EU.
Dealer	Sold in role-play shops
Content See safety data-sheet: dated 06/24/04.	NOC particles (no CAS-No.). Residual monomers (no CAS-No.). CAS: 94-36-0 Benzoyl peroxide [USAN] CAS: 7440-43-9 Cadmium pigments CAS: 13463-67-7 Titanium dioxide CAS: 68186-94-7 Mineral pigment (CAS-NO equal to C.I. Pigment Black 26). The Safety data-sheet does not state any risk assessment or concentrations
Content according to the label	The only substance mentioned is CAS: 80-62-2 methylmethacrylate.
Classification of CAS 94-36-0.	E; R2 Xi; R36 R43.
Classification of CAS 7440-43-9	CARC2;R45 F;R17 TX;R26 T;R48/23/25 REP3;R62-63 MUT3;R68 N;R50/53.
Classification of CAS 80-62-2	According to ECB: F; R11 Xi; R37/38 R43. According to LOFS, the substance is not classified
Marking of the product	The packing has the text that states in German: "Not a toy. Contains methylmethacrylate. Inflammable.

	Causes irritation to eyes, breathing zone and skin. Children under the age of 14 should only use the product under adult supervision. Liquid and powder not for consummation! Not recommended for crowns or orthodontia. In case of allergy towards the indicated content, do not use". There are no risk assessments or danger symbols.

25th product type	Tooth varnish
Producer	Produced in the EU.
Dealer	Sold in role-play shops.
Content cf. the homepage of the producer	CAS 67-63-0 Isopropyl alcohol 75 % CAS 12001-26-2 Mica (CI 77019) 25 % CAS 25067-02-1 Acrylate copolymers 15 % CAS 7631-86-9 Silica 5 % Pigments: CAS 1309-37-1 CI 77491 (iron oxide) CAS 51274-00-1 CI 77492 (iron hydroxide) CAS ?1317-61-9 CI 77499 (joxide) CAS 13463-67-7 CI 77891 (titanium dioxide) CAS 2611-82-7 CI 16255 (new coccine) CAS 1339-82-8 CI 77268:1 (pigment black 8).
Classification CAS 67-63-0	F; R11 Xi; R36-R67.
Marking of the product	Declaration of content, where isopropyl alcohol and acrylates copolymers are indicated

26th product type	Artificial blood
Producer	Produced in the EU.
Dealer	Sold in role-play shops
Content See safety data-sheet: **Content** cf. the label of the product:	CAS 99-76-3 Methylparaben 0,2 % CAS 122-99-6 Phenoxy ethanol 0,12 % CAS 35691-65-7 Methyldibromo glutaronitrile 0,03 %. Hydrogenated starch hydrolysate CAS 9004-62-0 Hydroxyethylcellulose CAS 68201-46-7 Peg-7 glyceryl cocoate CAS 9006-65-9 Dimethicone CAS 99-76-3 Methylparaben CAS 52-51-7 2-bromo-2-notropropane-1,3-diol.
Classification CAS 99-76-3	The Safety data-sheet states that it has a R43 – the substance is not recorded in LOFS or ECB.
Classification CAS 122-99-6	Xn; R22 Xi; R36.
Classification CAS 52-51-7	Xn; R21/22 Xi; R37/38-41 N; R50.
Marking of the product	Label, see above

27th product type	Blood capsules
Producer	Produced in the EU.
Dealer	Sold in role-play shops
Centent, cf the label	CAS 63-42-3 Lactose CAS 9005-25-8 Starch CAS 471-34-1 Calcium Carbonate 77-92-9 Citric Acid CAS 144-55-8 Sodium Bicarbonate CAS 128-44-9 Sodium Saccharin (+/- Red 7 CI 16255 (CAS 2611-82-7) og Black 1 CI

Content, of the safety data-sheet	28440 (CAS 2519-30-4)). A solution of: CAS 9000-70-8 Gelatine. Water. CAS 56-81-5 Glycerin. CAS 50-70-4 Sorbitol. Concentrations are not indicated
Classification	None.
Marking of the product	See above

3.2 Marking of products

Danish dealers and producers are of role-play products are mainly characterized by people who themselves are into role-playing activities. They are enthusiasts, who have build up a commercial angle to their interest.

It is CASA's general impression that these people genuinely wish that the product the sell to active role-player do not posses a risk to peoples health. On the other hand, they are part of an innovative environment, where the aim for a good quality in the equipment exceeds the will to live up to formal labelling requirements. Possible errors in the marketing of products is more a sign of lack of knowledge about the product than of malevolence, and generally, there is a will to make sure that the role players are not exposed to unwanted chemical action.

4 Questionnaire survey

In order to assess the real use of the materials that are used in role-play weapon production, a questionnaire survey was conducted among 10% of all clubs, youth centres and SFO's in Denmark (250 out of 2500) randomly drawn from a list provided by BUPL.

The survey was carried out by forwarding an e-mail with a link to an electronic questionnaire. In the e-mail, the institutions that have role-play weapon production were asked to complete the questionnaire.

54 out of the 250 institutions taking care of 7.300 children and youth completed or partly completed the form. The questionnaire was completed by the leader of the institution or the person in charge of role play.

Thus, the survey is not representative for all institutions, but only for those conducting role-play weapon making.

Among the institutions that did not return the questionnaire, a random check was conducted with 20 institutions and around 40% of these answered that they did have production of role-play weapons, but didn't fill in the questionnaire. Thus, a great share of the institutions that did not fill in the questionnaire produce role-play weapons.

In this chapter, we will go through the main points of the survey. The purpose of the survey was to uncover the practice in institutions that conduct role-play weapon production.

4.1.1 The youngest children mostly involved

Particularly children up until the age of 12 are involved in the production of weapons. In a few institutions, all children are involved, but on average, 25% of children in this group are involved.

Among the 13-14-year-olds, 10-15% are involved, while it is only a very in the group of children age 15 and above, and also, in general, only a few of these frequent a club.

4.1.2 Weapon production

37 institutions have informed what kind of equipment they produce.

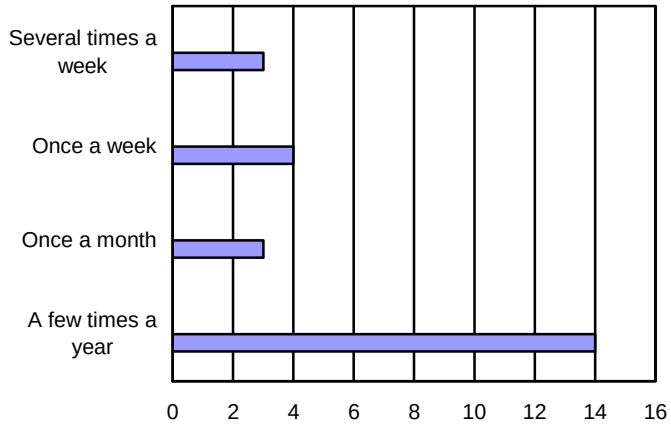
In 80% of the institutions, weapons are made with duct tape, while 34% of the institutions state that they use latex in weapon production. 17% of all institutions state that they produce ears, scars, masks etc. made of latex. 37% state that the produce other types of equipment.

In almost 50% of the institutions, where duct-tape weapons are produces, latex weapon and or latex ears are also produced.

Latex is part of the equipment production in 40% of the institutions that filled in the questionnaire.
15 institutions have stated the number of weapons typically produced. The average is around 120 weapons per year.

The figure below displays the frequency of weapon production in the 24 institution that answered this question.

Figure 7: How often does the institution make latex weapons?



Thus, in a little less that half of the institutions, it takes place at least once a month.

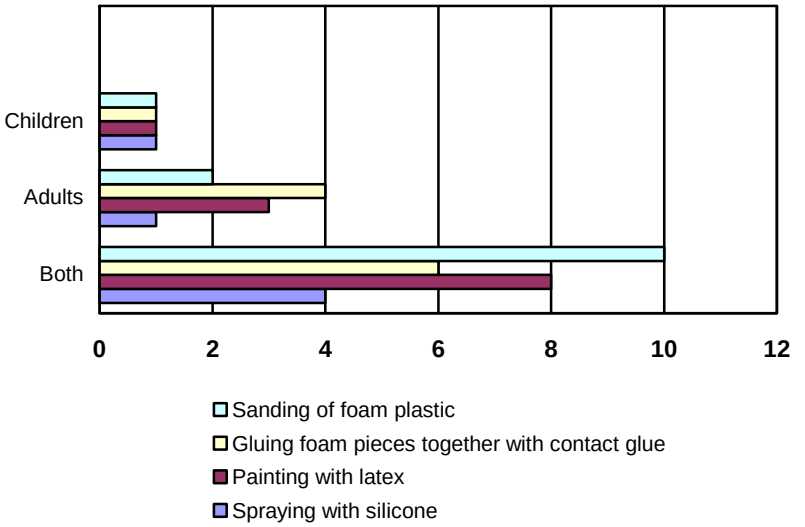
4.1.3 Children are involved in all processes

The production of role-play weapons involves a long chain of processes, where some are more straining to the health than others. 38 institutions have stated whether children, adults or both are involved in the different processes.

The general tendency is children are involved in all processes in the production – however predominantly in cooperation with an adult. In a few places, there are processes that are conducted by adults or children alone.

The figure below displays the result for a few chosen processes.

Figure 8: Who are involved in the various processes?



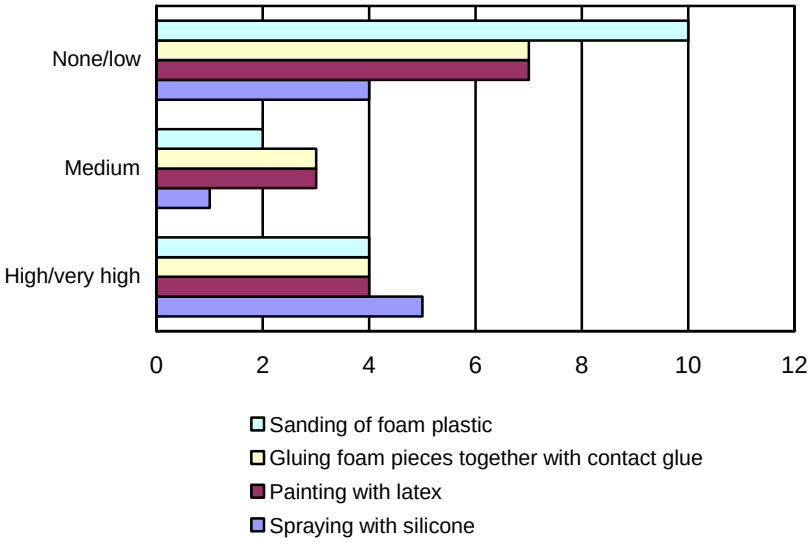
4.1.4 Different opinions on the evaluation of the health aspect

The institutions were asked to provide their opinion on what could affect the health of those who conduct the various processes in weapon manufacturing.

The responses from 34 institutions showed that this was assessed very differently, which indicates that there is generally great uncertainty about what is and what is not dangerous.

Below are the results for a few chosen processes. It is evident that the institutions do not agree to what may constitute a problem to the health. As an example, 4 institutions believe that there is nothing damaging to the health by spraying with silicone, whereas 5 institutions believe that it is highly or extremely damaging to the health.

Figure 9: How do the institutions assess the health risk during weapon production



4.1.5 The choice of materials is based on own experiences and network

When shopping for materials and products for use in the production of role-play equipment, there is often a wide range of product to choose from of different quality and price. 33 institutions have responded to the question of what governs their choice of materials.

The far most common response it is peoples own experiences and network that governs the choice. Many institutions have a person who is responsible for the role-play activities, and this person is often a former or active actor in the role-play environment. Recommendations from role-play shops or societies are less important.
Every third institutions experiments with different materials in order to either reduce the price and/or improve the quality of the finished product.

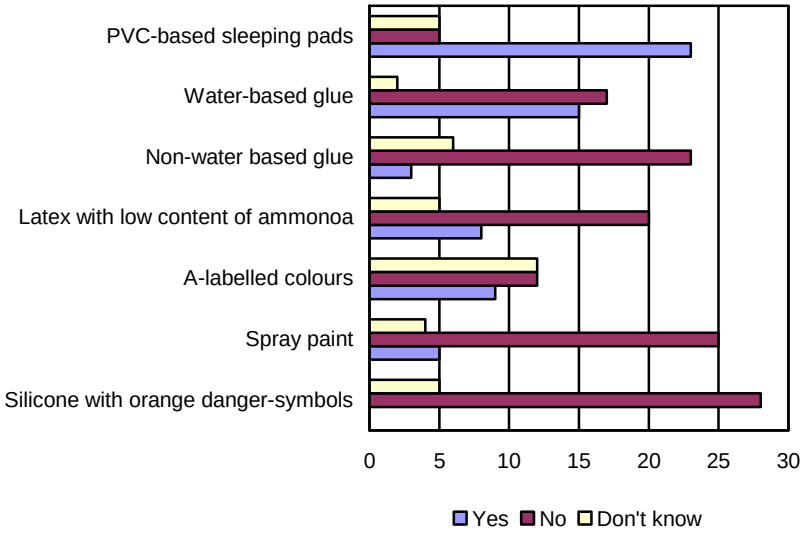
4.1.6 The use of selected types of material

For a number of materials, it is possible to choose from different types, with different chemical content.

The foam plastic that is used as the basis can be made of different types of plastic. Contact glue may be solvent or water-based. For silicone, auto spray-cans and other types may be used that are often marked with an orange danger symbols such as “highly inflammable” because of its content of butane and propane. There are alternative products which are not required to have danger symbols.

34 institutions have informed whether they use these materials, among other things.

Figure 10: Use of various material in the institutions



The answers show that relatively many of the institutions believe that they use PVC-based sleeping pads. However, most sleeping pads are made of foam plastic, and CASA therefore estimate that the responses are not based on actual knowledge of the materials. A few have stated that they choose A-labelled products. The A-label is a labelling created by Danish producer organisation. The A-label means that the colour livers up to a number of

demands to the content of unhealthy substances. The A-label is not widely known, and a good deal have responded “don’t know”.

The response to the question regarding silicone is probably caused by that fact that people are often not aware that there are danger symbols on silicone spray-cans. These products are solely distributed from role-play shops, with a mechanical pump, product that do not contain propellants and therefore do not require danger labelling.

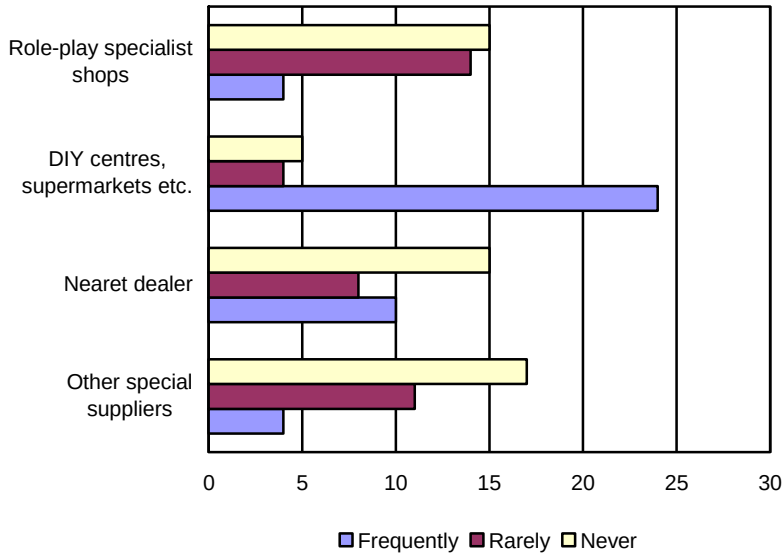
The responses indicate that the contact glue used is often water-based.

4.1.7 DIY centres and supermarket are main suppliers.

Most institutions primarily shop materials at DIY centres and supermarkets – and to a lesser extent in specialist shops, e.g. role-play shops. Only a few institutions shop on the internet.

Therefore, the expertise found in the role-play shops when it comes to choice of material and health aspects, is only limitedly used in relation to institutions.

Figure 11: Where do the institutions buy material



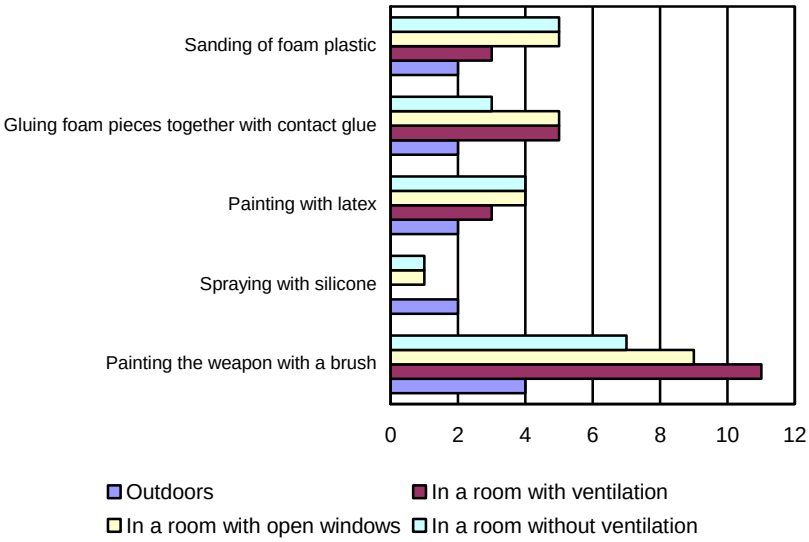
4.1.8 Limited ventilation and protection

The institutions were asked to describe the physical frames of the activities and to evaluate what is done is order to protect children (and adults) during the various working processes.

Only a few of the 35 institutions that responded, state that they have actual ventilation, meaning exhaustion or ventilation in the room where the production takes place. Ventilation is primarily used during the painting process. Others open the windows, or take the work outside. But some also work before closed windows.

The figure below displays the results of selected processes. The individual institution was allowed to mark several options.

Figure 12: where does the work take place



10 institutions work with latex, but only a few of the provide eye protection for the children.

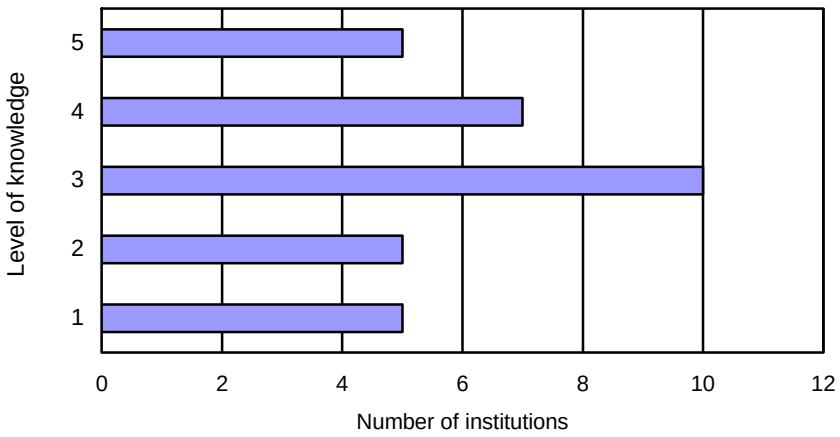
Gloves are used in 4 places, however, only sometimes, while aprons are more frequently used. In the suppliers' directions, it should be indicated whether gloves or the like should be used.

The regulations of Danish Working Environment Service do not apply to children, but only to the youth centre teachers participating in the work.

4.1.9 The level of knowledge in the institutions

32 institutions have estimated their own level of knowledge of possible risks in connection with the materials used. 5 have an expert level and 1 has a low level of knowledge.

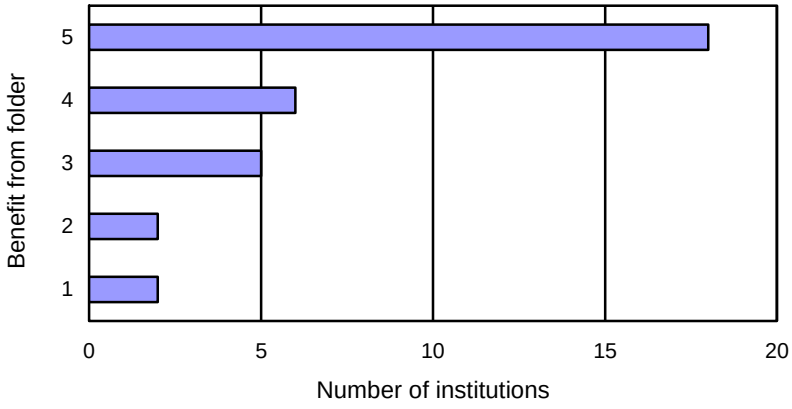
Figure 13: Level of knowledge in institutions



There is not necessarily a connection between the use of dangerous material and the level of knowledge. Among the 10 institution working with latex, 3 have indicated that they are on level 4 or 5, 2 have indicated that they are level 3 and 4 have placed themselves on level 1 or 2. 1 has not responded.

The institutions were asked if they believed they would benefit from a folder with information on the health aspects in relation to the production of equipment. 5 is high benefit, 1 is no benefit.

Figure 14: Benefit from folder



4 institutions have expressed low benefit (1-2), and 3 three of these are institutions that estimate themselves as having a high level of knowledge today.

4.1.10 Also weapon production outside the institutions

35 institutions have estimated how many children they believe are involved in production of role-play equipment elsewhere. A short 50% estimate that production only takes place in the institutions, and the remaining part have stated that production also at some scale takes place outside the institution. The answers indicate that it is estimate to primarily take place at home or in role-play societies.

5 Laboratory analyses

A small group of products was chosen for a closer examination:

- Wine skins
- Skin glue
- Liquid latex
- Foam plastic
- Masks

The analyses were carried out by Eurofins A/S in the fall of 2006. Their report is encloses as annex B.

5.1 Results

Below is a short summary of the analyses. We refer to annex B for further details.

5.1.1 Wine skins

Wine skins are a popular accessory. The interview role-play dealers have estimated that annual sales are around 3-4000 wine skins, but sales could be bigger, since this commodity is more widely sold than others.

A wine skin consists of a container wrapped in skin. The product is chosen in order to investigate what the water-proof container is made of.

The material was identified as being PVC softened with the phthalate DEHP. By determination in duplicate, the content of DEHP is determined be 22-25% (in weight).

5.1.2 Skin glue

As part of the getup, artificial latex ears are often glued to ones own ears. Annual sales are estimated to be around 15.000 artificial ears. There are many varieties of glues for this. Some come in the packet with the ears. The glue that was examined was found in one such packet. The glue was examined for solvents, VOC and SVOC.

Table 1: Results of the analysis for solvents, VOC and SVOC. The unit is mg/kg. The two results of solvent make the determination in duplicate

	Detection limit	Glue	
		A	B
Ethyl acetate	500	1.700	1.700
Ethanol	500	350.000	340.000
Acetone	500	770	740
1,1-Diethoxyethan*	50	64	
Alpha-pinen	50	2.600	
Beta-pinen*	50	460	
Limonen (terpen)	50	1.500	
Diethyl succinate*	50	65	
Alpha-terpineol*	50	59	
Triethelynglykol*	50	150	
Bornyl acetate*	50	57	
Sesquiterpener	50	750	
Diethyl phthalate	50	170	
Unidentified terpene group	50	22.000	
Ethyl palmitate*	50	72	
Ethyl linoleat*	50	210	
Ethyl oleat*	50	89	

*as closest identification possible. Calculated as toluene.

According to the results of the analysis displayed in table 1, 3 different solvents were detected: ethyl acetate, ethanol and acetone. Apart from this, 14 VOC/SVOC variant above the detection limit were detected.

5.1.3 Liquid latex

The main material in the production of weapon (and home-made equipment) is latex (natural latex). The basic form of the weapon is covered with latex, which is sold in liquid form. This is done by painting it of dipping the weapon in the latex, leaving it to dry and repeat the process a few times in order to obtain an adequately thick layer, as when dipping candles.

The latex products we have seen most frequently were based on the same basic product from Thailand containing, among other things, ammonia. The product is decanted into ones own containers by the dealers. Other latex products are sole with a lower content of ammonia. Annual sales are around 3000 litres.

Though a simulation test, it was examined what a person inhales when standing close to a container with liquid latex (e.g. during application to a sword).
Test of 2 different latex products, with allegedly different contents of ammonia, were conducted.

The air in the breathing zone was analysed for ammonia, nitrosamines and the organic substances VOC and SVOC.

Figure 15: Testing latex

Tabel 2: Resultats for ammonia, nitrosamines and VOC/SVOC. The unit is g/m$^{3.}$

	Detection limit	Latex A	Latex B
Ammonia	3	5.500	520
N-Nitrosodimethylamin	0,03	< 0,03	< 0,03
N-Nitrosomethylethylamin	0,03	< 0,03	< 0,03
N-Nitrosodiethylamin	0,03	< 0,03	< 0,03
N-Nitrosodipropylamin	0,03	< 0,03	< 0,03
N-Nitrosodibutylamin	0,03	< 0,03	< 0,03
N-Nitrosopiperidin	0,03	< 0,03	< 0,03
N-Nitrosopyrrolidin	0,03	< 0,03	< 0,03
N-Nitrosomorpholin	0,03	< 0,03	< 0,03
Ethanol	2	9,0	-
Ethyl acetate	2	-	4,4
Toluen	2	7,0	-
n-Butyl acetate	2	9,6	16

< Less than the detection limit
- not detected

The results of the analysis, as displayed in table 2, shows that there is a considerable difference in the vapour of ammonia in the two latex samples (factor 10), while nitrosamines were not detected in the air. In both sample A and B, small amount of various VOCs/SVOCs were detected.

5.1.4 Foam plastic

Foam plastic is used to form the basic shape of the weapon. Typically, a sleeping pad is used, which is cut to the right size and glued together around the glass-fibre core and the wood handle. Different varieties of foam plastic is used, primarily PE- containing plastic.

Figure 16: Testing of foam plastic

Through a simulation test, it was examined to which extent a person would be exposed to slip when hand sanding foam plastic with fine sand paper. The test showed, however, that the slip did not rise to the air, but dropped to the table. No considerable amount of slip was detected in the breathing zone.

5.1.5 Masks

There are various types of masks on the market that are pulled over your face. According to the users, they are soon very warm to wear and the sweat pours down your face. The masks are made of latex, which has been coloured. Annual sales are around 1000 rubber masks and a corresponding number of rubber helmets.

Through a simulation test where substances were released to artificial sweat, it was examined to what extend a person is exposed to MBT and VOC/SVOC from cast-solid latex masks that are worn during role playing.

2 different masks were tested – one produced in Demark, one in China. No migration MBT and VOC/SVOC was detected in any of the masks.

5.2 Health evaluation

It is not the aim of this project to perform a health evaluation of the found results. The Danish Environmental Protection Agency will on the basis of the results of the mapping decide to what extend it is necessary to conduct further investigations and to conduct a health evaluation of the results.

Contacted actors, distributors and producers

As part of the survey, CASA has conducted interviews with the following:

Preliminary meeting with

- LLR (the National Association of Live Role-player), which is an umbrella organisation covering a number of role play societies in Denmark

During the survey, active role players have also been interviewed.

Visits to and meetings with the following role-play distributors have been carried out:

- Faraos Cigarer, Copenhagen
- Arena, Copenhagen
- Dragons Liar, Odense
- Rokada, Bagsværd

And Johannes Fog, a DIY store in Lyngby

Visits to and meetings with the following suppliers and producers have been carried out:

- Panaltoke, Copenhagen (producer specialising in ready weapons and supplier of a number of products for production and maintenance)
- Jotunheim, Copenhagen (producer specialising in masks and helmets)
- Ronald A/S, Copenhagen (supplier of imported products for warehouse chains)

Visits to and meetings with the following role-play equipment producing youth clubs have been carried out:

- Huset, Frederiksberg (youth club)
- Klubben, Pinjevej in Gladsaxe

Furthermore, a questionnaire was distributed to a random 10% (250) of all youth centres in Denmark from a list provided by BUPL.

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1 Methods of analyses

1.1 IR

A number of subsamples were taken, and the surface was analysed through FT-IR analysis. By comparing the data library spectres, the polymer was identified.

1.2 Phthalates

A subsample was taken and extracted with dichloromethane with added internal standards. A subsample of the extract was taken and analysed directly by combining gas chromatography and mass spectrometry (GC/MS) with the aim to identify and quantify phthalates. The content was compared to the relevant phthalate standards. The detection limit is 50 mg/kg. The uncertainty factor of the analysis is 10-15% RSD

1.3 Solvents

A subsample was extracted with DMF (dimethyle formamide) with added internal standards. A subsample of the extract was taken and analysed by combining gas chromatography flame ionization detection (GC/FID). The content was quantitatively measured by use of response factors for external standards. The report limit is 500 mg/kg, and the uncertainty of the analysis is 10-15% RSD.

1.4 Volatile and semi-volatile organic compounds (VOC/SVOC)

A subsample with a known weight was extracted with dichloromethane with added internal standards. A subsample was taken and analysed directly by combining gas chromatography and mass spectrometry by scanning a larger mass area. The content was quantitatively measured by use of a response factor for external standards.

The report limit is 50 mg/kg.

1.5 Volatile and semi-volatile organic compounds (VOC/SVOC) on Tenax-TA tubes

The exposed Tenax TA-tubes were thermicaly desorbed and directly analysed by combining gas chromatography and mass spectrometry by scanning a larger mass area. The content was measured by use of specific relative response factors or were measured as the tolu (semi-quantitatively)

1.6 Migration test

Subtests of 1 dm^2 were added 100 ml of artificial sweat and incubated at 40ºC for 24 hours. The artificial sweat was a mix of NaCI, ammonium, lactic acid, carbamide and water according to DC/EN 1811. The carbamide test was analysed by determination in triplicate (A, B and C). After incubation, A and

B were analysed for MBT (see the analysis description 2.7). Furthermore, A and B were extracted according to the method description 2.4, but only A was analysed, since the chromatograms for A and B, respectively, were identical.

1.7 2-mercaptobenzothiazole (MBT)

After the incubation period, the artificial sweat was extracted with dichloromethane, dried over anhydrous natrium sulphate and evaporate down to dryness. It was resolved in acetonitrile, and thereafter, the extract was analysed with High Performance Liquid Chromatography (HLPC).

The detection limit is 2 μg/dm^2, and the uncertainty of the analyses is ca. 15%RSD

1.8 Exposure test

The aim of the exposure test was to demonstrate the sanding of plastic foam. A line of plastic foam was fastened to a rotating roller. Sandpaper, 120 grain, was placed on a stick, which was again tied to a circle on a rotating table. Thereby, the plastic foam was sanded with rotating movements. 36 cm above the plastic foam, equivalent to the breathing zone, total dust and respiratory dust was collected in membrane filters (0,8 μg). Total dust as well as respiratory dust was collected in accordance with the regulations of the Danish Working Environment Service. The duration of the test was 2.5 hours. The test was conducted at a constant room temperature. The ventilation was measured every 15 minutes.

1.9 Emission test

Liquid latex was poured into a 500 ml cup. The liquid was frequently stirred, equivalent to a continuous use of liquid latex. The emission was collected approx. 38 cm above the test, corresponding to the breathing zone of the user. The collection was conducted by means of Tenax-TA tubes to collect volatile and semi-volatile substances and Thermosorb/N tubes to collect nitrosamines. Furthermore, the emission was draught through wash bottles with sulphuric acid to collect ammonium. The test was conducted at a constant room temperature. The ventilation was measured every 15 minutes.

1.10 Nitrosamines

The Thermosorb/n tubes were extracted with organic solvent and analysed directly by combined gas chromatography and NO specific detection (GC/TEA 610). The detection limit is 0.03 μg/m^3.

1.11 Ammonium

The content of ammonium was detected through spectophotometric analyses. Ammonium was collected in wash bottles with dissolved sulphuric acid, and the content was then determined by spectophotometric analysis. The detection limit is 0.000003 μg/m^3, and the uncertainty of the analysis is ca. 15%RSD.
References: ISO 7150/2, NIOSH 6015 and VDI 2461/1.

2 Results

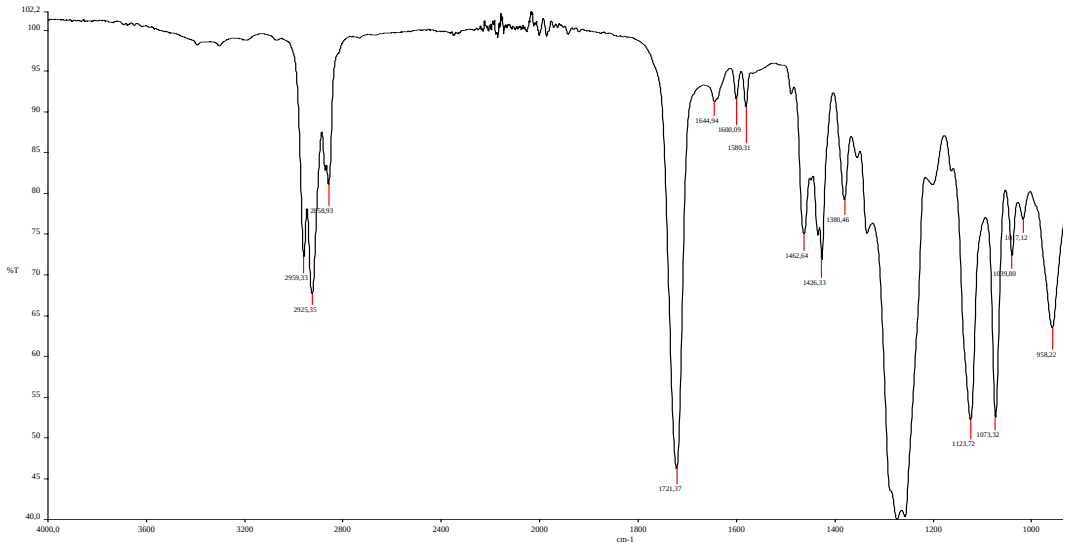
2.1 Wine skins

2.1.1 IR

The IR spectre of the inner surface of a wine skin is pictured below. By comparing the data spectres of polymers, the material may be recognised as PVC.

IRspectrum of the inner surface in sample 756511-03 (though the ATR-technique)

IRspektrum af den indvendige belægning i prøve 756511-03 (ved ATR-teknik):



2.1.2 Phthalates

The inner coating was equally tested for phthalates, and the results are described in table 1.

The analysis showed a presence of DEHP, and the amount present indicates that the material is softened by phthalates.

Table 1. Results of the analysis of phthalates. The unity is weight/%. The two results indicate the Dobbeltbestemmelserne.

	D.g.	Lab no. 3 Inner coating of drinking skin	
		A	B
Diethylhexylphthalate (DEHP)	50	22%	25%

2.1.3 Glue

The glue sample was analysed for solvents by determination in duplicate. Furthermore, the sample was screened for volatile and semi-volatile organic substances (VOC and SVOC). The results are displayed in table 2.

Table 2. Results of the analysis of organic substances, VOC og SVOC, mg/kg. De to resultater for opløsningsmidlerne angiver dobbeltbestemmelserne.

	D.g.	Lab no. 4	
		A	B
Ethylacetate	500	1.700	1.700
Ethanole	500	350.000	340.000
Acetone	500	770	740
1,1-Diethoxyethane*	50	64	
Alpha-pinene	50	2.600	
Beta-pinene*	50	460	
Limonen (terpen)	50	1.500	
Diethylsuccinate*	50	65	
Alpha-terpineol*	50	59	
Triethelynglycole*	50	150	
Bornyl acetate*	50	57	
Sesquiterpenere	50	750	
Diethylphthalate	50	170	
Unidentified TERPEN group	50	22.000	
Ethyl palmitate*	50	72	
Ethyl linoleate*	50	210	
Ethyl oleate*	50	89	

* best identification offer. Measured as the tolu.

2.1.4 Liquid Latex

The emission test was conducted on two latex samples. For every test, the emission was collected in the measured breathing zone of the consumer, and the emission was analysed for ammonium, nitrosamines and volatile and semi-volatile organic substances (VOC and SVOC). The results are displayed in table 4.

Table 4. Results for ammonium, nitrosamines and VOC/SVOC. Unities are $\mu g/m^3$.

	D.g.	Lab no. 5	Lab no. 6
Ammonium	3	5.500	520
N-Nitrosodimethylamine	0,03	< 0,03	< 0,03
N-Nitrosomethylethylamine	0,03	< 0,03	< 0,03
N-Nitrosodiethylamine	0,03	< 0,03	< 0,03
N-Nitrosodipropylamine	0,03	< 0,03	< 0,03
N-Nitrosodibutylamine	0,03	< 0,03	< 0,03
N-Nitrosopiperidine	0,03	< 0,03	< 0,03
N-Nitrosopyrrolidine	0,03	< 0,03	< 0,03
N-Nitrosomorpholin	0,03	< 0,03	< 0,03
Ethanole	2	9,0	-
Ethylacetate	2	-	4,4
Toluene	2	7,0	-
n-Butylacetate	2	9,6	16

< less than the detection limit
- not detected

2.1.5 Plastic foam

The exposure test demonstrated sanding of plastic foam with fine sand paper. The edges were sanded in order to demonstrate a realistic situation. The slip was collected in a filter in a distance corresponding to the breathing zone in order to measure the total amount of slip and the respiratory amount of slip.

Visually, however, the test showed that the slip and particles of the plastic foam dropped to the table instead of rising up. This was confirmed by the test, since no slip was detected in the filters of sample 7 and only an amount near the detection limit were found in sample 8, as displayed in table 3.

Tabel 3. Result of slip and respiratory slip, the unity being mg/m^3.

	D.g.	Lab no. 7	Lab no. 8
Total slip	0,1	< 0,1	0,1
Respiratory slip	0,1	< 0,1	0,2

< is less than the detection limit

2.1.6 Masks

Subsamples of two masks were exposed to artificial sweat for 24 hours. Then the artificial sweat was analysed for 2-mercaptobenzothiazole (MBT) and volatile and semi-volatile extractable substances. The results are displayed in table 5.

Results are indicated in mg/l sweat and thereafter converted into μg/dm^2 in order to relate the amount of chemical substances to the area of the mask.

MBT is analysed in analysed by determination in duplicate , i.e. in two different migration fluids, and the analysis for volatile and semi-volatile organic compounds is made as a single determination

Neither MTB nor volatile and semi-volatile organic compounds were detected in the artificial sweat, see table 5.

Tabel 5. Results for MBT and volatile and semi-volatile organic compounds. Results are indicated in mg/l and recalculated to μg/dm^2.

	D.g.	Lab no. 1	Lab no. 2
VOC/SVOC	25	< 25	< 25
MBT	2	A: < 2 B: < 2	A: < 2 B: < 2

< is less than the detection limit

R-Sentences and Notes

R1 Explosive when dry.
R2 Risk of explosion by shock, friction, fire or other sources of ignition.
R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.
R4 Forms very sensitive explosive metallic compounds.
R5 Heating may cause an explosion.
R6 Explosive with or without contact with air.
R7 May cause fire.
R8 Contact with combustible material may cause fire.
R9 Explosive when mixed with combustible material.
R10 Flammable.
R11 Highly flammable.
R12 Extremely flammable.
R14 Reacts violently with water.
R15 Contact with water liberates extremely flammable gases.
R16 Explosive when mixed with oxidising substances.
R17 Spontaneously flammable in air.
R18 In use, may form flammable/explosive vapour-air mixture.
R19 May form explosive peroxides.
R20 Harmful by inhalation.
R21 Harmful in contact with skin.
R22 Harmful if swallowed.
R23 Toxic by inhalation.
R24 Toxic in contact with skin.
R25 Toxic if swallowed.
R26 Very toxic by inhalation.
R27 Very toxic in contact with skin.
R28 Very toxic if swallowed.
R29 Contact with water liberates toxic gas.
R30 Can become highly flammable in use.
R31 Contact with acids liberates toxic gas.
R32 Contact with acids liberates very toxic gas.
R33 Danger of cumulative effects.
R34 Causes burns.
R35 Causes severe burns.
R36 Irritating to eyes.
R37 Irritating to respiratory system.
R38 Irritating to skin.
R39 Danger of very serious irreversible effects.
R40 Limited evidence of a carcinogenic effect.
R41 Risk of serious damage to eyes.
R42 May cause sensitisation by inhalation.
R43 May cause sensitisation by skin contact.
R44 Risk of explosion if heated under confinement.

R45 May cause cancer.
R46 May cause heritable genetic damage.
R48 Danger of serious damage to health by prolonged exposure.
R49 May cause cancer by inhalation.
R50 Very toxic to aquatic organisms.
R51 Toxic to aquatic organisms.
R52 Harmful to aquatic organisms.
R53 May cause long-term adverse effects in the aquatic environment.
R54 Toxic to flora.
R55 Toxic to fauna.
R56 Toxic to soil organisms.
R57 Toxic to bees.
R58 May cause long-term adverse effects in the environment.
R59 Dangerous for the ozone layer.
R60 May impair fertility.
R61 May cause harm to the unborn child.
R62 Possible risk of impaired fertility.
R63 Possible risk of harm to the unborn child.
R64 May cause harm to breastfed babies.
R65 Harmful: may cause lung damage if swallowed.
R66 Repeated exposure may cause skin dryness or cracking.
R67 Vapours may cause drowsiness and dizziness.
R68 Possible risk of irreversible effects.

Combination of R-sentences
R14/15 Reacts violently with water, liberating extremely flammable gases.
R15/29 Contact with water liberates toxic, extremely flammable gas.
R20/21 Harmful by inhalation and in contact with skin.
R20/22 Harmful by inhalation and if swallowed.
R20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
R21/22 Harmful in contact with skin and if swallowed.
R23/24 Toxic by inhalation and in contact with skin.
R23/25 Toxic by inhalation and if swallowed.
R23/24/25 Toxic by inhalation, in contact with skin and if swallowed.
R24/25 Toxic in contact with skin and if swallowed.
R26/27 Very toxic by inhalation and in contact with skin.
R26/28 Very toxic by inhalation and if swallowed.
R26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.
R27/28 Very toxic in contact with skin and if swallowed.
R36/37 Irritating to eyes and respiratory system.
R36/38 Irritating to eyes and skin.
R36/37/38 Irritating to eyes, respiratory system and skin.
R37/38 Irritating to respiratory system and skin.
R39/23 Toxic: danger of very serious irreversible effects through inhalation.
R39/24 Toxic: danger of very serious irreversible effects in contact with skin.
R39/25 Toxic: danger of very serious irreversible effects if swallowed.
R39/23/24 Toxic: danger of very serious irreversible effects through inhalation and in contact with skin.
R39/23/25 Toxic: danger of very serious irreversible effects through inhalation and if swallowed.
R39/24/25 Toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
R39/23/24/25 Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

R39/26 Very toxic: danger of very serious irreversible effects through inhalation.
R39/27 Very toxic: danger of very serious irreversible effects in contact with skin.
R39/28 Very toxic: danger of very serious irreversible effects if swallowed.
R39/26/27 Very toxic: danger of very serious irreversible effects through inhalation and in contact with skin.
R39/26/28 Very toxic: danger of very serious irreversible effects through inhalation and if swallowed.
R39/27/28 Very toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
R39/26/27/28 Very toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
R42/43 May cause sensitisation by inhalation and skin contact.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R48/21 Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
R48/22 Harmful: danger of serious damage to health by prolonged exposure if swallowed.
R48/20/21 Harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
R48/20/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R48/21/22 Harmful: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
R48/20/21/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.
R48/24 Toxic: danger of serious damage to health by prolonged exposure in contact with skin.
R48/25 Toxic: danger of serious damage to health by prolonged exposure if swallowed.
R48/23/24 Toxic: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
R48/23/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R48/24/25 Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
R48/23/24/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R68/20 Harmful: possible risk of irreversible effects through inhalation.
R68/21 Harmful: possible risk of irreversible effects in contact with skin.
R68/22 Harmful: possible risk of irreversible effects if swallowed.
R68/20/21 Harmful: possible risk of irreversible effects through inhalation and in contact with skin.

R68/20/22 Harmful: possible risk of irreversible effects through inhalation and if swallowed.
R68/21/22 Harmful: possible risk of irreversible effects in contact with skin and if swallowed.
R68/20/21/22 Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.

Note J:
The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (Einecs No 200-753-7). This note applies only to certain complex coal- and oil-derived substances in Annex I.

Note K:
The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0,1 % w/w 1,3-butadiene (Einecs No 203-450-8). If the substance is not classified as a carcinogen, at least the S-phrases (2-)9-16
should apply. This note applies only to certain complex oil-derived substances in Annex I.

Note L:
The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346. This note applies only to certain complex oil-derived substances in Annex I.

Note M:
The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0,005 % w/w benzo[a]-pyrene (Einecs No 200-028-5). This note applies only to certain complex coal-derived substances in Annex I.

Note N:
The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil-derived substances in Annex I.

Note P:
The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (Einecs No 200-753-7). When the substance is classified as a carcinogen, Note E shall also apply. When the substance is not classified as a carcinogen at least the S-phrases (2-)23-24-62 shall apply. This note applies only to certain complex oil-derived substances in Annex I.