Survey of Chemical Substances in Consumer Products

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Survey of chemical substances in auto polish and vax

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Contents

Preface

This report is included in the series of projects from the Danish Environmental Protection Agency's Consumer Section with the heading "Survey of chemical substances in consumer products".

The purpose of the project is a survey and estimation of exposure of chemical substances in auto polish and wax products. The intermediate aims of the project have been as follows:

1. A survey of the retail market for consumer figures and product types,
2. A survey of substances contained in auto polish and wax products, and
3. Preparation of exposure scenarios when using the products.

The project has been carried out by Jacob Ferdinand, Ole Kaysen and Claus Petersen, Econet AS during the period 1 May – 30 November 2003.

Head-space analyses have been carried out by Eurofins A/S.

The accompanying group consisted of Frank Jensen and Anette Ejersted from The Danish Environmental Protection Agency, together with Ole Kaysen and Jacob Ferdinand from Econet AS.

Summary and conclusions

The purpose of the project
The project is part of the Danish Environmental Protection Agency's contribution to surveying chemical substances in consumer products. The purpose is to achieve an estimate of which substances are being used in auto polish and wax products in the retail market and which precautions the consumer ought to take when using the products.

Previous surveys
No other surveys have been found regarding the effect of auto polish and wax products on the user, despite the fact that the product types are also used professionally, cf. chapter 1.

The products must, however, be assessed for their health hazards by the manufacturer or importer, as they are included in the Danish Environmental Protection Agency's regulations for among others classification and labelling of chemical substances and products. Furthermore, there is the Keminøglen[1] /1/, which is a list of chemical products being used in the automobile industry, including 5 auto polish and wax products. The products have been health assessed based on a working environment score. See section 3.6 for further explanation.

The retail market
65 different auto polish and wax products divided into 22 brands have been identified in the retail market. Three of these are spray can products. The product types are divided into pure polish products, pure protectants (wax, etc.) and combined auto polish and wax products. The volume of turnover in the retail market – i.e. sales to private users – is estimated at being 80 tons in 2003 with an uncertainty of ± 25%.

Regulation of and the consumer's information about the hazard of the products
Auto polish and wax products are, as mentioned above, comprised by the Danish Ministry of Environment regulations for chemical substances and products, cf. chapter 3. This means among others that retail sale of products that are classified as very toxic or toxic, is illegal.

The consumer is protected against misleading labelling of the products, among other things due to that labelling such as "harmless", "not harmful" and "does not contain (a certain substance)" is not permitted.

Approx. 50% of the substances on the list of the Danish Ministry of Environment showing dangerous substances /5/ is prohibited for use in products in aerosol spray cans. Furthermore, as a basis only 36 substances are permitted as propellants or solvents.

[1] Keminøglen has been published by Danish Industry, The Danish Automobile Industry and The Danish Association of Managers and Executives. See also www.envisage.dk

Auto polish and wax products must be classified as dangerous and consequently should be dangerous labelled. Hereby the consumer should be able to obtain sufficient information about the health and environmental hazardness of the product and information about precautions when using it. The survey has, however, shown that the labelling is not sufficient in all instances.

The code number labelling (the MAL code), which is only required for products for commercial use, is often also used on auto polish and wax products for the retail market. The information is a good supplement to the above mentioned hazard labelling but requires some knowledge to the numbering system, cf. section 3.3.2.

Procurement of the material safety data sheet of the product is a further possibility for information about especially precautions and means of protection during application.

Substances
Based on 57 safety data sheets and 8 full declarations of content (totally 58 out of 65 identified products) the identified substances in chapter 4 have been divided into 13 functional agent groups.

Health assessment based on the products' working environment score
All 58 products about which sufficient health information has been received, have been judged based on the same score system which is being used in the Chemical Key (Keminøgle) /1/.

77.5% of the products are given the lowest score of "1" for working environment, and respectively 8.5% and 14% get the score "2" and "3". The score "1" is in the Keminøgle defined as "There are no essential dangerous effects of the product". The score "2" or "3" have been defined "An effect could occur. It can, however, be minimised through careful and correct handling of the product".

Health assessment by exposure through skin contact
The products have furthermore been assessed for exposure when being in contact with skin and eyes based on the code numbering (MAL). In this case 90% of the products get the lowest number after the hyphen on 1[2] and the remaining 10% get the number 3[3].

Organic solvents with R66 and R67
Approx. 50% of the products contain organic solvents which should be supplied with the R-sentence R66: "Repeated exposure may cause skin dryness or cracking", however, very few of the products have been labelled with this. Likewise 1/3 of the products contain organic solvents which should

[2] The risk involved when working with products with the number 1 after the hyphen is in /2/ described as: "Products with contents of substances which can have a damaging effect through inhaling spray mist, dust, etc. There is no recognisable damaging effect on skin or eyes at non-dirtying work, but possibly at longer lasting or repeated dirtying work".

[3] The risk involved when working with products labelled with the number 3 after the hyphen is described in /2/ as: "Products with contents of ingredients which can have damaging effects when in contact with skin and eyes and also when inhaling spray mist, dust, etc. The damaging effect can also be allergy".

be supplied with the risk sentence R67: “Vapours may cause drowsiness and dizziness”, where only very few products have been labelled accordingly.

Allergy causing substances

6 products have been found with substances which have been classified R43 “May cause sensitisation by skin contact". Only one product has been labelled with a warning.

Conclusion

By far the most (approx. ¾) of the tested auto polish and wax products can according to the Keminøgle’s /1/ working environment score be used without causing any problems. However, many of the products could involve a risk for dried out skin and dizziness without using means of protection and good ventilation. This risk is due to the products’ contents of organic solvents. Approx. 10% of the products furthermore contain allergy causing substances.

In line with the recommended precautions and means of protection mentioned in the safety sheets of the products, it is generally recommendable to ensure good ventilation and to wear gloves of the type nitrile rubber, PVC or neoprene when using the products.

1 Previous surveys

The survey has been based on a review of previous reports of auto polish and wax. The intention was partly to get an estimate of the auto polish and wax products in the retail market and partly to utilise results from possible environmental and health reports for the survey of contents of substances in connection with the exposure study.

No previous health surveys of the use of auto polish and wax products have been made in Denmark. This has been concluded on the basis of search on the Internet and interviews with individuals who have a thorough knowledge of the working environment in the auto industry.

The National Institute of Occupational Health (AMI) has been contacted and searches have been made in their article data base on www.arbejdsmiljobutikken.dk. Furthermore, search has been made on industry guidance from the Industry's Branch Environmental Council on www.i-bar.dk without a useful result.

Auto polish and wax products are commercially used in auto appearance centres where new and used automobiles are styled and polished and also in and in connection with automobile workshops. In the Motor Industry's Employers' Association[4], The Automobile Industry, they are not aware of any working environment surveys of work with polish and wax products besides Keminøglen, which is mentioned below. It should be noted that the completion centres are not organised in an employers' association.

Neither have there been any health surveys of retail sales products. General searches have been made on the Internet on English-language surveys and on German Ökotest[5] and on Norwegian and Swedish homepages.

With regard to an estimate of the dangerousness of the products, 2 sources have been found, The Chemical Key[6] /1/ and a survey by the Norwegian Consumers' Council[7].

In the "Keminøgle", 5 auto polish and wax products have been evaluated with regard to working environment on the scale 1-5, with 1 as having the least influence on the working environment. Four of the products have been

[4] Personal interview with Jørgen Storm, The Motor Industry's Employers' Association.

[5] A German independent consumer magazine which makes and publishes chemical analyses based on a health and environmental point of view of a broad spectrum of consumer products. Their homepage contains many test results. It is www.oekotest.de.

[6] The Keminøgle is a list showing a wide range of chemical products in the automobile industry which have been evaluated for risks in the working environment, outer environment and oil separation. The publication can be seen on www.envisafe.dk.

[7] The Consumers' Council, Norway (2000). Blankt blikk. The consumer Report 7/2000. www.forbrukerportalen.no

evaluated to 1 and one product[8] to 3 on the working environment. A score of 1 is equivalent to "no major dangerous effects of products". A score of 3 is equivalent to "an effect can exist but can be minimised through thorough and correct handling of the product". Two of the products are also sold in the retail trade[9].

In connection with a quality survey of 10 auto polish and wax products[10] from the Norwegian Consumers' Council, carried out by the Norwegian Technological Institute[11]. The institute has evaluated the products' health and environmental hazard. Based on this, the institute has concluded that there is a minimal health hazard. "Some of the products contain small quantities of allergy causing substances, but are no worse than a detergent"[12].

[8] Brilliant Polish from Brdr. Larsen (Tegee Dan) is mentioned in the Keminøgle with score 1 instead of the correct score of 3. This has been concluded based on a review of the product's toxicity and exposure data and a presentation for Poul Erik Skakke, who maintains and evaluates products for the Keminøgle.
[9] The retailing products in the Keminøgle are "Pro 1 Autocare Polishing with Protector" (The Keminøgle: Brilliant Polish and "Sonax Formular + Wax".
[10] Eight out of 10 products are marketed on the Danish retail market.
[11] The Consumers' Council, Norway (2000). Blankt blikk. The consumer Report 7/2000. www.forbrukerportalen.no.
[12] The Consumers' Council, Norway (2000). Blankt blikk. The Consumer Report 7/2000. Statement by work hygienist Morten Berntsen, The Norwegian Technological Institute.

2 The retail market

2.1 Product types

The task of the project is to survey products of the type ”auto polish and -wax”. The products come under car care products in the assortment of the dealers. Car care products is a joint description for cleaning substances, washing substances, polishing substances, finishes and protectants for maintenance for the internal and external surfaces of the automobile.

The description ”polish” is being used with multiple meanings in the industry as both a cleaning agent, an abrasive (rubbing), a touch up and shining agent. For automobiles, polish is being sold for leather (seats and other trimmings), vinyl (interior surfaces and fenders), glass, metal surfaces and lacquered surfaces.

”Wax” for automobiles can likewise be used for both leather, metal surfaces and lacquered surfaces.

Based on this, it has been necessary to make a delimitation of the product types. After having spoken with the Danish Environmental Protection Agency, it has been clarified that the survey should concentrate on definite auto polish and wax products. This survey is consequently delimited to such products, which are being sold as polish and wax for lacquered surfaces and metal surfaces, i.e. primarily for external use of the automobile.

Especially car wash with wax and ”lacquer cleaning” has been left out of the survey. Car wash products added wax have been left out because they primarily are washing substances. “Lacquer cleaning” has been left out because it primarily is a cleaning agent even though in the marketing there is not always a significant distinguishing between “polish” and “lacquer cleaning”.

The report has identified 3 product types in the market: Polish, protectant and combined polish products and proctectant products.

”Auto polish” is being marketed as polishing substances for lacquered surfaces and metal surfaces. They are sold under names/descriptions such as “polish”, “cleaning polish” and “polishing agent”. Polish products contain a small quantity of protectants.

”Auto wax” is being marketed as protectants for lacquered surfaces and metal surfaces. They are being sold under names/descriptions such as “wax” and “lacquer protectants”. Wax is typically being used as protectant and consequently the protective layer on the lacquer or the metal surface. There are, however, a few products which instead contain substances which generate a glass-like surface.

Products with a combined effect, i.e. with polishing and protectant in one constitute a great part of the market. They are being sold under names/descriptions such as “polish & wax”.

The products which have been surveyed are all being marketed for the use on automobiles. Part of the products can likewise be used for other purposes and are also marketed as such. For instance for cleaning and polishing of metals, plastic, fibre glass, perspex, acrylic, white goods, glazed tiles and wooden furniture.

2.2 Retail sales

2.2.1 Sales distribution

Retail sales are mainly taking place through three types of distribution, namely: petrol stations, convenience stores (supermarkets, building markets, building markets) and motorist shops. Interviews with suppliers indicate that the sale of auto polish and wax products is roughly divided as indicated below:

- Petrol stations 50%
- Convenience stores 30% and
- Motorist shops 20%

Suppliers further inform that deliveries to these sales channels can be differentiated. This implies that a supplier mainly sells to a particular market segment, for instance convenience stores or to a well-defined chain, for instance petrol stations belonging to one of the oil and petrol companies in the Danish market.

2.2.2 Sources

The consumption of auto polish and wax products in retail sales has been attempted surveyed through combining information from several sources. No actual industry statistics or survey exist in this area, wherefore it has been necessary to collect information from both public sources as well as companies in order to get an impression of the consumption.

The following two sources must be considered as leading in connection with the consumption survey:

- Statistics Denmark and
- Supplier information

Information from Denmark Statistics is considered as appropriate to give an indication about the maximal size of the consumption.

To the extent that the suppliers are willing to contribute with sales figures, this source is considered as being the best suited to give a qualified estimate of the total consumption.

2.2.3 Statistics Denmark

In Statistics of Manufacturers sale and in the External Trade Statistics, auto polish substances appear as an independent group with the goods position number 3405 3000 00. The companies report to the tax authorities (Told & Skat). If it is unclear which goods position number the company should use, the choice should be made in co-operation with the tax authorities.

The Project has contacted a great number of suppliers and manufacturers of car care products and requested data. It appears from the replies that the companies report their purchases and sales on the above mentioned goods position number.

Table 2.1. Car care products with goods position number 3405 3000 00. Tons

	Import	Export	Production	Consumption
2000	728	490	59	297
2001	693	347	68	414
2002	603	255	25	373

As can be seen, the consumption in the Danish market can be calculated to 373 tons.

Interviews with suppliers indicate that the information from Statistics Denmark only to be used as an upper limit because the goods position is considered to cover many products and more than what lie within the project's delimitation of auto wax and polishing substances.

The calculated 373 tons are consequently assumed to cover the maximum sale to professionals and sales in the retail trade. It has not been possible to divide this sale into the two sectors in the statistical material. One single supplier estimates, however, that sales to professionals are 50 per cent larger than sales in the retail trade (weight percentage).

2.2.4 Supplier information regarding consumption

No industry association exists and it is therefore difficult to obtain a precise general view of suppliers of auto wax and polishing substances for the Danish market. Visits in the retail trade have resulted in identification of a long series of these products. Based on this suppliers have subsequently been approached.

The market is dominated by a few bigger suppliers (below 10) and many small. A few suppliers state that sales to do-it-yourself individuals (retail business sales) can be divided into 10-30% on the small suppliers and approx. 70-90% to the bigger. Furthermore, a declining market is expected in the short term, because today new automobiles are delivered with a lacquer finish which is considerably better and with a longer durability than previously, which reduces the demand and the extent of private automobile maintenance.

Based on the division between big and small suppliers, specific approaches have been made to the big suppliers in order to obtain a more reliable estimate of the quantities being sold in the retail business.
In the approach questions have specifically been asked about:

1. which suppliers are considered dominating the market,
2. the size of their total market share, and
3. how large a quantity is being marketed in the retail business.

To the first question, the big suppliers replied very consistently and in accordance with the observations which the Project has noted. Among the biggest suppliers the following can be included. They are listed in alphabetical order:

- Alaska
- Basta
- Simoniz
- Sonax
- Turtle

Based on the 5 suppliers' replies to questions 2 and 3, the total sale in the retail business is estimated as being on a level equal to 80 tons with an uncertainty of ± 25%. A few suppliers have based on their own market researches estimated that approx. 1,000,000 units are sold annually. With an average packing size of ½ litre and a specific gravity of =1, this equals a quantity of 50 tons.

In 2002 the number of automobiles was registered to just about 1.9 million units [13]. If it is assumed that a dosage of 0.5 litre is sufficient for four polishings of a car, approx. each fifth car will be polished once yearly by do-it-yourself consumer.

[13] Statistics Denmark, Statistical Yearbook 2002.

3 Information about health hazards and safety precautions

This chapter describes the possibilities which the consumer has to get an idea about health hazards and safety precautions when using auto polish and wax products.

The most and important information can be seen directly on the label of the product. This applies to labelling for health hazards (hazard symbols and risk phases, section 3.1) and safety instructions (safety phases, section 3.1, and code numbers, section 3.2). In addition there are eco labels (among others the Nordic "Svanen" - the swan) for these products, section 3.3 which among others include requirements for minimising the health risk for the consumer. An eco labelled product, however, primarily means that it is among the most environment friendly in the market in its product group.

The product's potential safety data sheet or supplier instructions, section 3.4, supplies more detailed information about conditions regarding health and environment. Safety data sheets can often be acquired at the supplier or manufacturer on their respective homepages or through direct approach.

Finally, as previously mentioned there is the Keminøgle/1/, which primarily contains evaluation of professional products. See section 3.5.

3.1 Legal regulation of the products

The Chemical Law's definition of chemical substances and products does among other things comprise auto polish and wax products. The product group is consequently comprised by the Chemical Law and its derived orders, which are issued with warrant in the Chemical Law.

The chemical legislation includes many limitations regarding the contents of chemical substances in consumer products. However, most of them are not directly relevant for auto polish and wax products. The five relevant laws and orders, which concern the health of the consumer, are mentioned and briefly described in Table 3.1. The rules mentioned in section 3.1.1-3.1.3 naturally apply to chemical substances and products generally.

Table 3.1. Regulation of auto polish and wax products concerning health of the consumers.

Official title	Number and date of the order	Popular title	The relevance of the direction for the product group
Consolidated Act on Chemical Substances and Products /3/	LBK No. 21 of 16/01/1996	The Chemical Law	This is the framework direction for regulation of chemical substances and products in Denmark.
Statutory Order on classification packaging, labelling, sale and storage of chemical substances and products./4/.	BEK No. 329 of 16/05/2002	The classification order	The product group is comprised by the order's rules about classification, packing, labelling, sale and storage.
Statutory Order on the list of dangerous	BEK No. 439 of 03/06/2002	The list of dangerous	The list is being used in connection with the classification of a product. It

Official title	Number and date of the order	Popular title	The relevance of the direction for the product group
substances /5/		substances	should be noted that not all dangerous substances are listed and that all substances must basically be self –classified.
Statutory Order on the use of propellants and solvents in aerosol spray cans /6/.	BEK No. 571 of 29/11/1984		For products in spray cans and atomizer bottles, it is permitted that only certain substances are used as propellants and solvents. The substances and their application limitations are mentioned in the annex to the order.
Order regarding limitation of sale and use of certain dangerous chemical substances and products for specifically indicated purposes /7/.	BEK No. 1042 of 17/12/1997		For products in spray cans and atomizer bottles all very toxic and toxic substances are prohibited (>0.1%) and substances which in the list of dangerous substances are labelled "Ae" are likewise prohibited.

3.1.1 Very toxic and toxic products

According to the Chemical Law /3/ and the Statutory Order on classification /4/, no chemical products which are to be labelled with the hazard description "very toxic" or "toxic" must be sold in the retail trade.[14] Please note that a product can contain relatively large quantities of toxic substances without having the hazard description "toxic"[15], However, please see 3.1.3 regarding products in aerosol cans.

It is prohibited to sell products to private persons, which are classified as carcinogenic, can cause mutagenic damages or toxic to reproduction. However, the products are permitted to contain substances with these effects if the contents of the substances in the product are below respectively 0,1%, 0,1% and 0,5% of the product.

3.1.2 Misleading labelling

Chemical substances and products must not be sold under conditions which could mislead the consumer with regard to the utilisation of the product or the risk which is connected to it, cf. § 41 in the Statutory Order on classification /4/.

This means that for instance the product's label must not be supplied with a statement which could give the consumer the impression that the product does not involve a risk for human beings. For instance declarations such as "Harmless", "Not toxic", "Not health damaging" "No obligation to label" or "Tested for…". Statements must not be used either which indicate that the

[14] Certain "very toxic" and "toxic" products can, however, be sold against purchase order from the police, cf. § 24 in the Chemical Law /3/.

[15] Products must contain up to 25% agents with an acute toxicity (R25 toxic when being consumed, R24 Toxic when being in contact with skin and R23 Toxic when being inhaled), up to 10% substances with chronic damaging effects with a single exposure (R39 Danger for serious damage of health) and repeated exposures (T;R48 Serious health danger through a longer period's effect. Please note that R48 can be given both the danger description T Toxic and Xn Harmful).

product does not contain certain substances, unless it is considered to be relevant information for the consumer.

3.1.3 Prohibition on certain substances in aerosol spay cans

For chemical substances in spray cans certain rules apply for the substances contained.

Generally all very toxic and toxic substances are prohibited in spray cans /7/. In addition all substances with the note "Ae" in the List showing Dangerous substances are prohibited /7/. This applies to approx. half of the approx. 2,600 substances which are presently on the list /5/.

Only 36 substances are permitted as propellants and solvents in spray products, cf. the annex in /6/. However, several chemical spray products in the market contain other propellants and solvents than the ones specified in the order, as the Danish Environmental Protection Agency in special cases can give exemption.

3.2 Hazard labelling

The Statutory Order on classification /4/ makes requirements about classification and labelling of dangerous chemical substances and products, /3/. Label wording on an auto polish and wax product is thus a significant and simple source for the consumer to obtain information about the health hazard of the product.

All auto polish and wax products must before a sale be evaluated by the manufacturer/importer according to the rules of classification of chemical products in the Statutory Order on classification. If the product has been evaluated as dangerous, it must be supplied with a label according to the rules in this Statutory Order. The rules are very comprehensive and complex. Below are only outlined the general hazard labelling and a single of the special labelling rules.

The general hazard label consists of the hazard description of the product, the danger symbol and one or several risk phases, cf. annex A. For a product - which has been classified as "harmful" (Xn) or "corrosive" (C) - the chemical substances must be indicated on the label which have been classified "harmful" or "corrosive" and which cause classification of the product. Certain other substances within specific danger classes, among others sensitising substances (substances which can cause allergy), must in addition be specified when they cause classification of the product.

With regard to auto polish and wax products, a special hazard labelling rule should be mentioned about chemical products which contain sensitising substances. If the product has not been classified as sensitising, but still contains such a substance in a concentration of = 0,1%, the label must be supplied with the note: "Contains (the name of the sensitising substance). Can cause allergic reactions".

3.3 Safety labelling

3.3.1 Safety phases

As a consequence of the product's hazard labelling, the Statutory Order on Classification requires that the label of the product is supplied with information which stipulates the safety considerations, which the consumer ought to exercise when handling the product. These are called S-phases or safety phases.

3.3.2 Code Numbers

The code number (MAL) label is only compulsory for chemical products in commercial use.

The specification of code numbers for a chemical product complies with the rules /2/ of the National Working Environment Authority and indicate which safety precautions should at a minimum be taken in certain working situations. It consists of two figures tied together with a hyphen. After this is often indicated "(1993)", which informs that the code number is specified exactly according to the rules in the mentioned order for specification of code numbers. A code number can thus look like this: "1-1 (1993)". The code number has the synonym the MAL-code, where MAL means Measuring Technique of Working Hygienic Air Requirements.

The figure before the hyphen in the code number specifies the safety precautions or means of protection which should be taken against inhalation of vapours coming from the contents of volatile substances in the product, including organic solvents. The figures are specified 00, 0-, 1-. 2-, 3-, 4- and 5- before the hyphen. Increasing figures specify increasing requirement for ventilation and use of respiratory equipment.

Auto polish and wax products' contents of volatile substances and their method of application can be compared with paint goods and paint goods-like surface coating (protecting, protectants). Consequently, it is relevant to compare the requirements which the legislation has to work with this type of products. In the Statutory Order on work with code numbered products /8/, it is specified precisely which safety precautions or means of protection the user must as a minimum take when using paint or paint goods-like surface coating. Extracts from the order can be seen in Table 3.2. A gas filter of the type Al is recommended as it protects against organic solvents. It should be stressed that the requirements are specified with a high safety margin for longer lasting work. Often good ventilation will be a sufficient safety precaution.

Table 3.2. Safety precautions against inhalation of vapours when working with paint goods-like surface coating. Extracts from chart II.3 I/8/

The figure before the hyphen	Outdoor work	Indoor work
00-	No particular	No particular
0–	No particular	No particular
1–	No particular. a)	No particular
2–	Gas filter mask. b), c), d).	No particular. e)
3–	Gas filter mask. b), d)	Gas filter mask. d)
4-	Full mask supplied with air e)	Gas filter mask. d)
5-	Full mask supplied with air	Full mask supplied with air

Notes:

a) However, gas filter mask in static air.
b) On small surfaces work can be done without respiratory equipment.
c) At effective natural ventilation work can be done without respiratory equipment.

d) Half mask supplied with air must be used if work is done with products which contain low boiling fluids (boiling point <65 °C). In niches, etc. half mask supplied with air must be used.
e) At short lasting work, maximum one hour per day, a gas filter mask can be used. However air supplied respiratory equipment must be used when working with products containing low boiling fluids.

The figure after the hyphen in the code number indicates the safety precautions which should be taken when there is a risk:

1. that hair and eyes are in direct contact with the product, including spray mist,
2. to inhale drops or dust from a spray mist of the product or dust coming from the product, and
3. unintended consumption of the product.

The figures are indicated –1, –2, –3, –4, –5, –6 after the hyphen. Increasing figures after the hyphen indicate increasing requirement for the use of safety precautions.

Table 3.3. indicates in extracts the safety precautions which according to /8/ should be taken when working with paint goods or paint goods-like surface coating. For products with oil derived substances, it is recommended to wear gloves made of nitrile rubber or similar.

Table 3.3. Safety precautions against contact with skin, etc. when working with paint goods-like surface coating. Extracts from chart II.3 i /8/.

The figure after the hyphen	Safety precautions
–1	Gloves. f), g), h)
–2	Gloves. f), g), h)
–3	Gloves. g), h)
-4	Gloves, face shield, hood and protective suit
-5	Gloves, face shield, hood and protective suit
-6	Gloves, face shield, hood and protective suit

Notes:

f) If the hands are not dirtied by the product, work can be done without wearing gloves
g) At sprinkling work, a face shield must be used and either a hood, helmet or cap with a large brim. Possible recommended eye protection is eliminated.
h) A pull-on suit must be used when becoming dirty takes place to such a degree that ordinary work clothes do not protect against skin contact with the product.

3.4 Eco labelling

Auto polish and wax products can be labelled with the Nordic eco label "Svanen" (The Swan). The product group is comprised by the Swan label's criteria set for car maintenance substances, cf. /9/. The Swan certified products are labelled with the swan logo as shown. This survey has identified one swan labelled auto polish and wax product in the retail market.

The criteria set for car care products make demands both to the influence on the external environment and the working environment.

The main requirements regarding potential influences on the working environment are:

1. The product must not be classified as flammable, explosive or harmful with the exception of the safety phases R10, R11, R22, R36, R37, R38, R65 and R66. See Annex A

2. The product must not contain organic compounds,
3. The product must not contain fragrance[16].

3.5 Material safety data sheets (user instructions)

Even though there are only requirements to make material safety data sheets for chemical products to be used commercially /10/, such safety data sheets also exist for many chemical products in the retail market. The data sheet can be ordered by contacting the importer of the manufacturer. In some cases the safety data sheets can be taken from the importer's or the manufacturer's homepage.

A material safety data sheet for a chemical product must contain headings and information about the following:

1. Identification of the substance/material and of manufacturer, supplier or importer, including information about trade name and potential product registration number (PR-No.) supplied by the National Working Environment Authorities,
2. The composition/information of ingredients contained, including the substances and materials which are classification liable according to the Danish Environmental Protection Agency's rules of classification.
3. Hazards identification,
4. First aid measures,
5. Fire fighting measures, including information about precautions at fire,
6. Accidental release measures, including information about safety precautions to deal with spills,
7. Handling and storage, including information about safety precautions at storage,
8. Exposure control/personal means of protection, including information about safety precautions when being exposed to the substance or material, and about use of personal protective equipment
9. Physical-chemical properties,
10. Stability and reactivity, including information about characteristics at heating and fire,
11. Toxicological information (dangerous to health properties), including information about possible symptoms upon ingestion or absorption into the organism,
12. Ecological information,
13. Disposal considerations, including information on measures in connection with disposal,
14. Transport information,
15. Regulations information, including information about for instance use limitations, requirements for special training, special requirements for age, etc.
16. Other information, including fields of application.

[16] This is an indirect consequence of a rule in the criteria set about the anaerobic decay of the products, to which no fragrance substances have yet been found to meet the requirements. Source: The Eco Label Secretariat. "Fragrance is included under influence on the working environment because many fragrance substances are being suspected of causing allergy (sensitising)"

The material safety data sheet thus contains, in addition to the danger and safety labelling, which can already be read on the product's label, among others important information about storage, use of protection means and removal of the product.

3.6 The Keminøgle and the working environment score

As mentioned in chapter 1, the Keminøgle /1/ is a useful tool to obtain knowledge about among other things working environment for chemical auto products, including auto polish and wax products

The basis for the calculation of a working environment score is an effect factor which is calculated by multiplying a factor for exposure with a factor for toxicity. The working environment score's generation is described here because it is being used as an evaluation basis in chapter 5 for the products which are surveyed in this report.

3.6.1 Toxicity factor

A product is given the toxicity factor 1, 2, 4, 6 or 8 according to a reference table for the classification of the product, annex B. As appears from the table, the toxicity factor also takes into account the product's harmfulness in regard to contact with among other things skin and eyes. The reference table originally derives from the Danish Environmental Protection Agency's life cycle evaluation tool UMIP[17].

3.6.2 Exposure factor

The exposure factor of the product is a function of the product's assigned figures before the hyphen in the code number, cf. section 3.3.2. It appears by checking tanle 3.3.

Table 3.3. The exposure factor.

Exposure factor	1	2	3	4
Code number (1993): Figure before hyphen	00–;0–	1–; 2–	3–	4–; 5–
Vapour pressure at 20° C, mmHg	p≤1	1<p≤10	10<p≤200	200<p
Relative evaporation rate R	R≤0,1	0,1<R≤2	2<R≤15	15<R

Note: As a function of the figure before the hyphen in the code number

3.6.3 The effect factor

The effect factor in Table 3.4 is found by multiplying the toxicity factor and the exposure factor of the product.

[17] UMIP is an EDP-based development tool for Development of Environmentally Friendly Industry Products. The Project ran under the Danish Environmental Protection Agency in co-operation with five enterprises during the period 1991-1996.

3.6.4 The working environment score

The working environment score is assigned based on the calculated effect factor – see Table 3.4

Table 3.4. The working environment score as a function of the effect factor.

Effect factor	Working environment score
1-2	1
3-4	2
5-12	3
13-18	4
19-32	5

A product can be assigned the score 1, 2, 3, 4 or 5 on working environment. The score is an indication of the risk for the consumer to be exposed to dangerous substances. Increasing figures indicate the increasing health risk.

4 Contents of substances

4.1 Data basis for identification of contents of substances

Information about contents of substances has been obtained from manufacturers and importers. The data basis is summarised in the appendix.

In the first phase the market has been surveyed to contain 65 products from 22 independent brands, based on the project product definition in section 2.1.

Manufacturers and importers have subsequently been requested to send forward contents declarations or as a minimum safety data sheets (section 3.1.3). A total of 57 safety data sheets and one contents declaration have been received – a total of information about 58 products. 55 of the products are in solid or fluid form and three products exist as spray (aerosol spray cans). The three spray products are all protectants.

In the second phase 10 products out of 57 were chosen for chemical analysis and further examination. Five of the products were chosen because their brands were estimated to represent more than 90% of the bulk sales in the retail market. The remaining five products were chosen from a mixture of missing material safety data sheets, contents of dangerous substances and a high code numbering of = 3 before or after the hyphen (section 3.2.1).

The 10 products have been chemically analysed for volatile substances by means of a headspace analysis The results and explanations can be found in Annex C. The purpose of the analyses was to form a basis for a possible selection of one or several products for an exposure test. The results primarily confirmed a qualitative content of volatile organic solvents which are not harmful when inhaled. Based on this there was no basis for starting an actual exposure test.

In order to evaluate the user's exposure to the products at skin and eye contact, the manufacturers and importers were requested to forward the contents declarations of the products. The manufacturers and importers were in this way presented with the results of the headspace analyses. Seven declarations have been received and furthermore one feedback about a product where the importer has confirmed and denied contents of certain substances based on the results of the headspace analysis.

Information about contents of substances is thus reported based on information from 58 products. The breakdown on information and product types is shown in the below Table 4.1.

Table 4.1. The survey's data basis for agents contained.

	Safety data sheets	Further information	Complete content declarations sent hereof.
A. Polish products	13		2
B. Protectants	29		3
C. Polish and protectants products	15	1	3
Total	57	1	8
Grand total		58	

4.2 Classification and categorising of substances

The classification of below mentioned agents contained has been made in priority sequence based on:

- List covering dangerous substances /5/
- Advisory list for self-classification of dangerous substances /11/
- The manufacturers' own information of hazards and
- Internet search on the substances in question.

The categorising of the functionality of the content of substances has been made based on a combination of specific knowledge of the substances' likely function in the product, direct information from the manufacturers of the products in question and a probability through searches on the Internet of the specific substances.

4.3 The functional composition of the products

Auto polish and wax products are, in line with many other chemical products in the household, combined by many substances in order to meet the quality requirements. The gross list below describes the functional groups which may occur in an auto polish and wax product.

1. Abrasives
2. Rinsing agents
3. Protectants
4. Organic solvents
5. UV-Absorbers
6. Fillers
7. Emulsifiers
8. Thickening agents
9. Preservatives
10. pH-regulating agents
11. Colouring agents
12. Scents
13. Propellants (aerosol spay cans)

As appears from the tables in section 4.4, the three product types (polish, protectants and combined polish and protectants) differ distinctly because they are combined functionally differently. Polishes typically contain a lot of abrasives, rinsing agents and organic solvents. Protectants typically contain neither abrasives nor rinsing agents, less organic solvents than the two other product types and a lot of protectant. The combined product type typically contains no rinsing agents, but both abrasives and also a lot of organic solvents and protectant.

4.4 Identifiable content of agents

The following categorising of the identified content of substances on their function in the product has been made to give a systematic presentation of the agents. Consequently, it is not a question of categorising a health hazard. In chapter 5 the products are being health assessed. Descriptions of used risk phases (Rxx) in the classification can be found in annex A.

Please note that the hazard indications and risk phases in the column "Classification" are a classification of the substance and not of the product and that regard has not been paid to the limit values of the Statutory Order on Classification as to when the substance should be included in the product classification. In the Statutory Order /4/ no attention has been paid to the classification of the substances when classifying the entire product, when their concentration is below 1% in the product [18].

In column 5 in all tables below listing content of substances, it has been recorded from which of the three product types: (a) Polish, (b) Protectant and (c) Combined polish and protectant, the individual substance has been identified – see Table 4.1..

4.4.1 Abrasives

Table 4.2. Identified abrasives.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Aluminium oxide	1344-28-1	5 og >50	–	2 (a,c)
Kaoline	66402-68-4	<20	ND	3 (c)
Silicone	7631-86-9	<12	ND	3 (a,b,c)
Silicone chalk	ND	29	ND	1 (a)
Zink stearate	557-05-1	<2.5	–	1 (a)
Calcium bicarbonate	471-43-1	1-5	–	1 (b)

Note.: ND means missing data and EN - means that the substance has not been classified.

4.4.2 Rinsing agents

Table 4.3. Identified rinsing agents.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Butyl acetate 98 %	123-86-4	1.5	R10 R66 R67	1 (a)
Ammonia water 25%	1336-21-6	4.5	C;R34 N;R50	3 (a)

[18] The limit value is, however 0.1% for substances which are classified as toxic, carciogenic, mutagenic and toxic to reproduction. For sensitising substances (R42 and R43), however, also applies that when the concentration of the substancet in the product is on =0.1, the label must be added the words: "Contains (the name of the sensitised agent). Can cause an allergic reaction".

4.4.3 Protectants

Table 4.4. Identified protectants.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Aminidimethyl polysiloxane	ND	<1	ND	1 (b)
Amino organo-siloxane	ND	0.25-0.5	ND	1 (b)
Carnauba	8015-86-9	<1.35	ND	2 (a,c)
Carnauba/Paraffin wax mixture 54:46	ND	1-2	ND	1 (b)
Polydimethyl cyclosiloxane	69430-24-6	0.00877	ND	1 (b,c)
Decamethyl cyclopentasiloxane	541-02-6	0.001-0.005	ND	2 (b,c)
Dimethyl siloxane, HO-term Rxn methyl trimethoxysilane & amino ethylamino-propyltrimethoxysilane	69430-37-1	0.093-0.465	ND	1 (b,c)
Dimethyl polysiloxane	9016-00-6	1-5	ND	1 (b)
Hexamethyl cyclotrisiloxane	541-05-9	ND	ND	1 (c)
Iso stearic acid (Aliphatic acid, montan wax)	68476-03-9	1-5	–	1 (b)
Octamethyl cyclotetrasiloxane	556-67-2	0.0135	Rep3;R62 R53	1 (c)
Paraffine wax	8002-74-2	1-5	–	2 (b,c)
Polydimethyl siloxane	63148-62-9	1.74622	–	6 (b,c)
Trimethoxy(methyl)silane	1185-55-3	0,045	Xn;R22	1 (c)
Silicone fluid 100cs (trade name)	ND	0.5-1.0	ND	1 (b)
Silicone fluid 500cs (trade name)	ND	0.5-1.0	ND	1 (b)
Silicone unspec.	ND	2.5-10	R11 Xi;R36/38	1 (c)
Silicones unspec.	ND	ND	ND	5 (b,c)
Polydimethyl siloxane,(((3-((2-aminoethyl)amino)propyl) silylidyne)tris(oxy)tris-,methoxyterminated	67923-07-3	0.3915	Xi; R 38-41	1 (c)
Dimethyl siloxane,(aminoethyl aminopropyl)dimethoxy-, siloxy- and hydroxyterminated	71750-81-7	0.9	Xi 36/38	1 (c)
Teflon (PTFE)	9002-84-0	0.2-1	ND	2 (b,c)
Chemcor EM KSL30N (trade name) montane wax emulsion	Bl.a 73138-45-1	<17	ND	1 (c)
Wax not spec.	ND	ND	ND	7 (b,c)

Note: ND means missing data and EN - means that the substance has not been classified.

4.4.4 Organic solvents

Table 4.5. Identified organic solvents.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified.
Distillates (crude oil), hydrogene treated light (unspec. petroleum)	64742-47-8	5-30 og >50	Xn;R65 R66	10 (a,b,c)
Distillates (crude oil), hydrogen treated light paraffin-	64742-55-8	<25	–	1 (a)
Distillates (crudeolie), light distillate hydrogen treatment process-, low boiling	68410-97-9	<80	F;R11 Xi;R36/37, Xn;R65og N;R51/53	2 (b)
Ethanol	64-17-5	5-15	F;R11	1 (b)
Heptane	31394-54-4	70-100	F;R11 Xn;R38 R65 R67 N;R51/53	1 (b)

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified.
White spirit	8052-41-3	<60	R10 Xn;R48/20-R65	5 (a,b,c)
Naphtha (crude oil), hydro desulphurized heavy	64742-82-1	<46	R10 Xn;R65 R66 R67 N;R51/53 og Xn;R48/20 R65 R66[19]	11 (a,b,c)
Naphtha (crude oil), hydrogene treated heavy	64742-48-9	5 substances <15, 8 substances 15-50, 2 substances 60-95	R10 Xn;R65 R66 R67	15 (a,b,c)
Naphtha (crude oil), light alkylate	64741-66-8	1-5	Xn;R65	2 (a)
Naphtha, hydrogene treated light	64742-49-0	50-70	F;R11 Xn;R65	1 (b)
N-paraffin (C10-C13)	64771-72-9	7 substances <15, 1 substance 15-30	Xn;R65	8 (a,b,c)
Petroleum (crude oil)	8008-20-6	10-30	Xn;R65 R66	5 (a,c)
Solvent naphtha (crude oil), nedium heavy aliphatic	64742-88-7	10-30	R10 Xn;R48/20-R65	2 (b,c)

Note: EN – means that the substance has not been classified.

4.4.5 UV-Absorbers

Table 4.6. Identified UV-absorbers.

Name of substance	CAS-No.	Concen-tration %	Classification	Number or products in which the substance has been identified
2-(2H-benzotriazol-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol	3147-75-9	1-5	N;R50/53	1 (b)
UV-Absorbtion substance not spec.	ND	ND	ND	2 (b)

Note: ND means missing data.

4.4.6 Fillers

Table 4.7. Identified fillers.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Sillitine N82 (Yellow chalk)	ND	7.92	ND	1 (b)
Water	7732-18-5	9-84	–	14 (a,b,c)

Note: ND means missing data and EN – means that the substance has not been classified.

[19] If the products' flash point is above 21°C, the first classification applies. Otherwise the last applies.

4.4.7 Emulsifiers

Table 4.8. Identified emulsifiers.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
1, 2, 3- propane triol, homopolymer, (Z)- 9- octadecenoate	9007-48-1	1.0	ND	1 (c)
2,2',2''-nitrilo triethanol (triethanolamine)	102-71-6	<1	Xi;R36/38 R43	1 (a)
Oleic acid	112-80-1	0.5	Xi;R36/38	3 (a,b)
Fatty alcohol ethoxylate	61791-28-4	<5	Xi;R36/38	4 (c)
Isotridecanol, ethoxylated 12 EO	69011-36-5	1-5	Xi;R36/38	1 (b)
Stearic acid	57-11-4	<2.5	Xi;R36/37/38	1 (a)
Tall oil fatty acid	ND	8	ND	1 (a)

Note: ND means missing data

4.4.8 Thickening agents

Table 4.9. Identified thickening agents.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Alkyl quaternary Ammonium Bentonite	68953-58-2	1,5	ND	1 (c)
Xanthan gum	11138-66-2	<1	–	2 (b)

Note: ND means missing data.

4.4.9 Preservatives

Table 4.10. Identified preservatives.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
1,2-benzisothiazol-3(2H)-on	2634-33-5	<0.5	Xi;R43	1 (a)
5-chlorine-2-methyl-2H-isothiazol-3-on	26172-55-4	<2.5	T;R23/24/25, C;R34, Xi;R43 N;R50	4 (a,b,c)
2-methyl-2H-isothiazol-3-on	2682-20-4	<2.5	Xi;R43	4 (a,b,c)
Isopropyl alcohol	67-63-0	<5	F; R11 Xi;R36, R67	4 (b,c)

4.4.10 pH-regulating agents

Table 4.11. Identified pH-regulating agents.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Morpholine	110-91-8	1-3	Xi;R36/38	3 (b,c)

4.4.11 Colouring agents

Table 4.12. Identified colouring agents.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
CI 42053 Patent green	2353-45-9	0.0001	ND	1 (b)
CI 47005 Quinoline yellow	8004-92-0	0.0006	ND	1 (b)
Colour non spec.	ND	5-15	ND	1 (b)
Colour non spec.	ND	ND	ND	2 (b)

Note: ND means missing data.

4.4.12 Scents

Table 4.13. Identified scents.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Camphene	79-92-5	0.004	F;R11 Xi;36 N;R50/53	1 (c)
Pin-2(3)-en (alpha-pinene)	80-56-8	0.009	N;R50/53	1 (c)
Pin-2(10)-en (beta-pinene)	127-91-3	0.005	N;R50/53	1 (c)
7-methyl-3-methylene-1,6-octadien (myrcene)	123-35-3	0.001	ND	1 (c)
Alpha-terpinol	98-55-5	0.001	ND	1 (c)
Bicyclo(2.2.1)heptane-2-ol, 1,3,3-trimethyl-,acetate	13851-11-1	0.01	ND	1 (c)
Bicyclo(2.2.1)heptane-2-ol, 1,7,7-trimethyl-,acetate, (1S-endo)- (L - born - 2 - yl acætate)	5655-61-8	0.002	ND	1 (c)
Bicyclo(2.2.1)heptane-2-ol,1,7,7-trimethyl-,(1S-endo)- (borneol)	464-45-9	0.002	ND	1 (c)
Bicyclo(7.2.0)undec-4ene, 4,11,11-trimethyl-8-methylene-,(1R-(1R*,4E,9S))- (caryophyllen)	87-44-5	0.002	ND	1 (c)
Bitter Orange Oil	8028-48-6	<10	R10 Xi;R36/38	3 (b)
D-Limonen	5989-27-5	0.004	R10 Xi;R38 R43 N;R50/53	1 (c)
Eucalyptus globulus, Ext.	84625-32-1	0.028	ND	1 (c)
Castor oil, sulphated, sodium salt	68187-76-8	<5	Xi R36/38	1 (a)
Benzoic acid, Methyl-2-hydroxy[20] (has been indicated as scent substance, but can also be used as a preservatives	119-36-8	<0.1	Xi;R36/38	1 (b)
Rosmarinus officinalis (rosemary)	84604-14-8	0.03	ND	1 (c)
Fragrance non spec.	ND	ND	ND	3 (b)

Note: ND means missing data.

[20] Has been indicated by the manufacturer as scents, but is generally used as a preservative.

4.4.13 Propellants (Aerosol spray cans)

Table 4.14. Identified propellants (aerosol spray cans).

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
Carbon hydrides, C3-4-(propane/butane)	68476-40-4	<25	Fx;R12	2 (b)

4.4.14 Substances with unidentified functionality

Table 4.15.Fejl! Ukendt argument for parameter. Substances with unidentified functionality.

Name of substance	CAS-No.	Concen-tration %	Classification	Number of products in which the substance has been identified
2-dimethylaminoethanol	108-01-0	0.5-1.0	R10 Xn;R20/21/22 C;R34	1 (b)
Paraffin oil	8042-47-5	<5	–	3 (a,c)
Poly(difluorinemethylene), a -fluorine-w -[2-[(1-oxooctadecy)oxy]ethyl]-	65530-65-6	0.085-0.45	ND	1 (b)

Note: ND means missing data and EN – means that the substance has not been classified.

5 The consumer's exposure to substances

5.1 The working environment score of the products

As indicator of the consumer's health risk when using auto polish and wax products, it has been chosen to use the same working environment score as is used the Keminøgle /1/, cf. section 3.6.

The working environment score has been calculated for all 58 products for which information has been received. The result can be seen in Table 5.1 below.

Table 5.1 Working environment score for 58 auto polish and wax products.

Working environment score	Polish products	Protectants	Wax and polish products	All products
1	7 (55 %)	25 (83.5 %)	13 (86.5 %)	45 (77.5 %)
2	2 (15 %)	1 (3.5 %)	2 (13.5 %)	5 (8.5 %)
3	4 (30 %)	4 (13 %)	0 (0 %)	8 (14 %)
Sum of products	13 (100 %)	30 (100 %)	15 (100 %)	58 (100 %)

In Keminøglen the individual scores are defined as follows:

- Score 1: There are no significant dangerous effects of the product.
- Score 2-3: An effect could occur, but can be minimised when handling the product thoroughly and correctly.

Table 5.1 shows that almost 77.5% of the surveyed products have the lowest working environment score. Of the remaining approx. 20%, the higher score is primarily due (9 out of 13 products) to a combination of high volatility and dangerousness of the organic solvent.

Six of the products with the score 2 or 3 have the label Xn; R48/20, which means danger: Serious health hazard through a longer period's effect at inhalation. The effect is naturally reduced considerably with good ventilation. The effect is non-ignorable, but should, however, be seen in connection with the fact that the products are at a maximum used 2-4 times a year with a duration of ½-1 hour at a time. The manufacturers of these products, however, recommend suitable respiratory equipment when the ventilation is not sufficient (mask with filter type A).

Four of the products with the score 2 or 3 have local irritating effects when inhaling vapours and at skin contact.

The remaining three products have got the score 2 based on a possible allergy causing effect with R43. Can cause allergy when in contact with the skin. Please also see section 5.2 below.

5.2 Exposure at skin contact

5.2.1 Code numbering

The 58 products' effect when in contact with skin and eyes has been estimated based on the code numbering of the products, i.e. the figure after the hyphen, cf. section 3.3.2 The result can be seen in Table 5.2.

Table 5.2. The products' effect when in contact with skin and eyes

Code number. The figure after the hyphen	Polish products	Protectants	Wax and polish products	All products
1	11 (85 %)	28 (93 %)	13 (87 %)	52 (90 %)
3	2 (15 %)	2 (7 %)	2 (13 %)	6 (10 %)
Sum of products	13 (100 %)	30 (100 %)	15 (100 %)	58 (100 %)

According to /2/, the risk when using the product with "1" after the hyphen in the code number is defined as follows: Products with content of substances, which can have a dangerous effect when inhaling spray mist, dust, etc. No dangerous effect on skin or eyes at non-dirtying work has been recognised, but possibly at longer lasting or repeated dirtying work.

At products with the figure "3" after the hyphen, the risk is described: Products with content of ingredients which can have a dangerous effect when in contact with skin and eyes and when inhaling spray mist, dust, etc. The damage effect can also be allergy.

Based on this, 90% of the products have little or no recognised dangerous effect at ordinary use. The remaining 10% (6 products), which have the figure "3" after the hyphen in the code number, can according to the above mentioned definition have a hazardous effect. However, the danger labelling of five of the six products does not reflect this fact. In most of the products' safety data sheets it is indicated that a person ought to wear gloves made of a rubber material, for instance nitrile rubber.

5.2.2 Organic solvents with R66 and R67

As appears about the products' contents of organic solvent in section 4.4.4, the products contain a large amount of organic solvents with high concentrations, which has been given especially R66 (Repeated exposure may cause skin dryness or cracking), but also R67 (Vapours may cause drowsiness and dizziness). R66 is given to substances which do not fulfil the criteria for R38 (Irritates the skin), but which in practice have been seen to dry it out. A total of 25 or little less than half of the surveyed products contain substances, which are classified R66.

In 19 products of 1/3 of the surveyed products, there are substances which have been given R67, primarily due to the crude petroleum product naphtha (crude oil), hydrogene treated heavy (CAS-No. 64742-48-9). On many safety data sheets of the products in which this substance is contained, the substance has, however, not been classified as R67. The products are consequently not labbelled R67 when the concentration of the substance is more than 15%.

Even though approx. 50% of the products contain substances with R66 and 1/3 with R67, only very few have been labelled accordingly. Based on this, it is therefore recommendable that the consumer always makes sure to avoid skin

contact or wear gloves and also makes sure that there is good ventilation when using auto polish and wax products.

5.2.3 Allergy causing substances

In six of the 58 products substances have been found which have a detected or possible allergy causing effect at skin contact, i.e. R43 (Can give allergy when in contact with the skin), cf. table 5-3. Only one of the 6 products is labelled with a warning on the label. It is uncertain based on the given information of the other products whether they ought be supplied with a warning[21] and/or labelled with R43. The concentration must in that case be respectively = 0.1 % and = 1 %).

Based on this, there is a small but still significant fraction (approx. 10%) of the products which contain allergy causing substances. The allergy causing effect of the products will naturally be reduced considerably or eliminated completely when wearing gloves of the type nitrile rubber, PVC or neoprene during the use of the product.

Table 5.3. Products which contain allergy causing substances with R_{43}

Name of substance	CAS-No.	Concen-tration	Classification
2,2',2''-nitrilotriethanol (triethanolamin)	102-71-6	<1	Xi;R36/38 R43
1,2-benzisothiazol-3(2H)-on	2634-33-5	<0.5	Xi;R43[22]
5-chlorine-2-methyl-2H-isothiazol-3-on	26172-55-4	0-2.5	T;R23/24/25, C;R34, Xi;R43 N:R50
2-methyl-2H-isothiazol-3-on	2682-20-4	0-2.5	Xi;R43
5-chlorine-2-methyl-2H-isothiazol-3-on	26172-55-4	0.0015	T;R23/24/25, C;R34, Xi;R43 N:R50
2-methyl-2H-isothiazol-3-on	2682-20-4	ND	Xi;R43
D-Limonen	5989-27-5	0.004	R10 Xi;R38 R43 N:R50/53

Note: R43: Can give allergy when in contact with the skin. ND means missing data. The substances 5-chlorine-2-methyl-2H-isothiazol-3-on (INCI-name Methylchloroisothiazolinone) and 2-methyl-2H-isothiazol-3-on (INCI name methylsothiazolinone) appear together in the ratio 3:1 under the trade and popular name Kathon.

It should furthermore be mentioned that fragrance substances are considered as potentially allergy causing. The survey has identified 16 scent substances in 9 products, cf. table 4.13, out of which only D-limonen (table 5.3 above) is officially classified with R43.

5.3 Summary

By far the largest part (approx. ¾) of the surveyed auto polish and wax products can according to the Keminøgle's /1/ working environment score be used without problems. However, many of the products involve a certain risk for skin dryness and dizziness without use of protection means and good ventilation. This risk is due to the products' content of organic solvents, Approx. 10% of the products furthermore contain allergy causing substances.

However, it seldom appears that the product can cause the three mentioned effects. It is therefore recommended, in line with the safety data sheets'

[21] Contains (name of the sensitising agent's name). May cause allergic reactions
[22] Advisory list for self-classification according to /11/.

instructions for precautions and protection means, that when using the product, one should make sure to have good ventilation and wear rubber gloves of the type nitrile rubber, PVC or neopren.

6 List of references

/1/ The Industry's Trade Working Environment Council (2003). The Keminøgle – List of Chemical Products in the Automobile Business – utilisation, health and environment. 4. edition.

/2/ National Working Environment Authority (1993). BEK No. 301 of 13/05/1993. Statutory Order of specification of code numbers.

/3/ The Danish Environmental Protection Agency (1996). LBK No. 21 of 16/01/1996. Consolidated Act from the Ministry of Environment and Energy on Chemical Substances and Products.

/4/ The Danish Environmental Protection Agency (2002). BEK No. 329 of 16/05/2002. Statutory Order on classification packaging, labelling, sale and storage of chemical substances and products.

/5/ The Danish Environmental Protection Agency (2002). BEK No. 439 of 03/06/2002. Statutory Order on the list of dangerous substances. http://www.mst.dk/liste/SgListe.htm.

/6/ The Danish Environmental Protection Agency (1984). BEK No. 571 of 29/11/1984. Statutory Order from the Ministry of Environment and Energy on the use of propellants and solvents in aerosol spray cans.

/7/ The Danish Environmental Protection Agency (1997). BEK No. 1042 of 17/12/1997. Order regarding limitation of sale and use of certain dangerous chemical substances and products for specifically indicated purposes.

/8/ National Working Environment Authority (1993). BEK No. 302 of 13/05/1993. Statutory Order regarding work with code numbered products.

/9/ Nordic Eco Labelling (2003). Criteria document for eco labelling of automobile maintenance products, ver. 3.5 of 12th February 2003. www.ecolabel.dk.

/10/ National Working Environment Authority (2002). BEK No. 559 of 04/07/2002. Statutory Order regarding special obligations for manufacturers, suppliers and importers, etc. of substances and materials according to law on working environment.

/11/ The Danish Environmental Protection Agency (2001). Advisory list for self-classification of dangerous substances. Is only available electronically on the homepage on the Environmental Protection Agency on the address http://www.mst.dk/kemi/02040300.htm.

Hazard descriptions and risk phases

The following are those hazard descriptions and risk phases that are used in connection with the identified content of substances in chapter 4.

1.1 Fire and explosion hazards

R10 Flammable
NB: No danger symbol

F  Very inflammable	R11 Highly flammable

Fx  Extremely flammable	R12 Extremely flammable

1.2 Health Hazard

Xn  Harmful	R20 Harmful by inhalation R21 Harmful in contact with skin T;R23/24/25 Toxic by inhalation , when in contact with skin and Toxic if swallowed (the danger symbol Toxic at a concentration of more than 25% of the substance) R48 Danger of serious damage to health by prolonged exposure and Rep3;R62 Possible risk of impaired fertility 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

Xi  Irritant	R36 Irritating to eyes R37 Irritating to respiratory system R38 Irritating to skin R43 May cause sensitisation by skin contact
C	R34 Causes burns

 Corrosive	R35 Causes severe burns

Toxicity factor for allocating the working environment score

According to section 3.6, the below mentioned table is to be used in connection with allocating a product's toxicity factor. The classification of the product is to be used as reference.

Working environment and external environment	Toxicity factor = 1	Toxicity factor = 2	Toxicity factor = 4	Toxicity factor = 6	Toxicity factor = 8
Acute toxicity		Xn; R65 R66-67	Xn; R20-21-22	T; R23-24-25	Tx; R26-27-28
Irritation, corrosive		Xi; R36-37-38	C; R34-35-41		
Allergy causing			Xi; R43 or included on at least one of the used lists in the allergy list[1]	Xn; R42 or specified as allergy causing when inhaled on the allergy list[1]	
Irreversible damage effect/ damages to organs (including Neuro toxicity)			Xn; R40 or R48 in combination with R 20-21-22 or	T, R39 in combination with R23-24-25 or R33	T; R48 in combination with R23-24-25 eller Tx; R39 in combination with R26-27-28
Genotoxicity				Xn; R46 or R40	T; R46
Cancer causing characteri-stics				Xn; R40 Or on GV-list[2], IARC group 2A or 2B[3](possibly cancer causing)	T; R45 eller R 49 Or on GV-list[2], IARC[3] group 1 (cancer causing)
Reproduction toxicity or deformities					T; R60 or R61 Or Xn; R62 or R63 or R64
Information level	The composition is known. No agents with any known damaging effect				Insufficient data about the composition of the product

[1] National Working Environment Authority (1990). Allergi-og overfølsomhedsfremkaldende stoffer i arbejdsmiljøet. AMI report 33/1990.
[2] National Working Environment Authority (2000). Grænseværdier for stoffer og materialer. AT-guideline C.0.1, october 2000.
[3] IARC. Monographs. Overall Evaluations of Carcinigenicity to Humans.

Results of headspace analyses

The below table shows the results of the headspace analyses. The classification has been made based on the Statutory Order on the list of dangerous substances /5/, The Danish Environmental Protection Agency's Advisory list for self-classification of dangerous substances /11/ and search on the Internet. The list has been sorted according to name of substances.

The analyses have been carried out using the following procedure:
1 g sample is weighed out in a 50 ml headspace glass. The sample is incubated in a heating cupboard at 50°C±2°C for 2 hours. A part quantity of the gas phase is injected directly and analysed at gas chromatography with mass spectrometric detection (GC/MS). The detected components are identified using the NIST library of mass spectres and scientific judgement. The content of the detected components is not quantified.
The analyses are carried out in double identification.

Name of agent	CAS No.	Classification	Product number									
			1	2	3	4	5	6	7	8	9	10
2-methylnonane	871-83-0	N;R50/53		x	x				x			
3-methylnonane	5911-04-6	N;R50/53		x	x				x		x	x
4-methylnonane	17301-94-9	N;R50/53			x				x			
Butylcyclohexane	1678-93-9	Xn;R22 N;R51/53		x	x			x			x	
Decahydro-1-methylnaphthalene	90-12-0	Xn;R22 R43 N;R50/53						x			x	
Decahydro-2-methyl-naphthalene	91-57-6	Xn;R22 R43 N;R51/53						x	x		x	
Decahydronaphthalene				x	x			x	x		x	
Decamethylcyclopentasiloxane	541-02-6	Xn				x	x					
Decane	124-18-5	N;R50/53	x	x	x	x		x	x		x	x
Diethylcyclohexane				x								
Dimethylbenzene (Xylene)	1330-20-7	R10 Xn;R20/21 Xi;R38										x
Dimethylcyclohexane	583-57-3, 590-66-9, 591-21-9, 638-04-0	Xn;R22, Xn;R22, Xn;R22 N;R50/53 og Xn;R22 N;R50/53		x	x							
Dimethylhexane (octanisomer)										x		
Dimethylnonane (or methyldecane)				x	x				x		x	
Dodecane	112-40-3	N;R51/53	x	x				x	x	x	x	x
Acetic acid butyl ester											x	
Ethylmethylbenzene												x
Ethylmethylcyclohexane				x	x				x		x	
Eucalyptol (1,8-cineol)	470-82-6							x				

Name of agent	CAS No.	Classification	Product number									
			1	2	3	4	5	6	7	8	9	10
Hexamethylcyclotrisiloxane	541-05-9					x	x					x
Limone (dipentene, D-limonen)	138-86-3	R10 Xi;R38 R43 N;R50/53				x						
Methylcyclohexane	108-87-2	F;R11 Xi;R38 Xn;R65 R67 N;R51/53		x								
Methyldecane (2-methyldecane)	6975-98-0	N;R50/53		x	x				x		x	
Methyloctane	2216-33-3, 2216-34-4, 3221-61-2	N;R50/53									x	
Methylpropylcyclohexane					x				x			
Nonane	111-84-2	N;R50	x	x	x	x			x			x
Octane	540-84-1, 560-21-4, 564-02-3, 565-75-3	F;R11 Xi;R38 Xn;R65 R67 N;R50/53	x	x								x
Pentadecane	629-62-9	N;R51/53	x									
Propylcyclohexane	1678-92-8	Xn;R22 N;R51/53			x							
Tetradecane	629-59-4	N;R51/53	x									
Tridecane	629-50-5	N;R51/53	x	x				x				x
Trimethylbenzene	95-63-6, 108-67-8, 526-73-8	R10 Xn;R20 Xi;R36/37/38 N;R51/53, R10 Xi;R37 N;R51/53, Xn;R22 N;R51/53										x
Trimethylcyclohexane	1678-97-3, 1839-63-0, 2234-75-5	Xn;R22 R43, Xn;R22 N;R50/53, Xn;R22 N;R50/53		x	x				x		x	
Trimethylheptane										x		
Trimethylhexane	Flere	N;R51/53								x		
Trimethylpentane (octanisomer)	540-84-1, 560-21-4, 564-02-3, 565-75-3	F;R11 Xi;R38 Xn;R65 R67 N;R50/53								x		
Not identified alkeners				x				x			x	
Not identified aromatic compounds											x	x
Not identified cyclic hydrocarbons				x	x	x		x	x		x	x
Not identified ether, ketone or oxy compounds				x					x			x
Not identified compounds				x	x			x	x		x	x
Not identified branched and unbranched alkanes				x	x			x	x	x	x	x
Not identified silane and siloxane compounds				x		x	x		x			
Undecane	1120-21-4	N;R50/53	x	x	x			x	x		x	x