AUGUST 2023

# BACKGROUND AND REQUIREMENTS

## DISPOSABLE NITRILE GLOVES – DRAFT FOR HEARING

ASTHMA ALLERGY NORDIC

# Asthma Allergy Nordic

*August 2023, version 1.0 – draft for hearing*

## Content

# Background and Requirements for Labelling of Disposable Nitrile Gloves with Asthma Allergy Nordic Allergy Label

This document describes the background and requirements set for disposable nitrile gloves (nitrile is also called synthetic latex) intended for personal use. In the document, each section will have a background text explaining, why the requirement is set and the reasoning behind the level of requirement, followed by the requirement itself and the accompanying documentation requirement; this is marked in a light blue box. A summary of the requirements can be found in Appendix 1. **Please note**, that all requirements relevant for the product type must be met in order to be recommended by Asthma Allergy Nordic.

Criteria for disposable nitrile gloves applies to products intended for use or wear as a personal item, to provide coverage/shielding or function as a physical barrier. The products are in direct skin contact during use and possibly for a prolonged time. The materials used in the products may contain substances that can cause allergic skin reactions in people already sensitized.

Nitrile gloves sold on markets across the world may be regulated under different sets of legislations. In Europe there are several regulations in place that include disposable gloves e.g., the EU REACH Regulation (1907/2006/EC), the EU Medical Devices Regulation (2017/745/EC), and the EU Personal Protection Equipment (PPE) Regulation (2016/425/EC) and there may be corresponding legislation in other countries. Even though there are several regulations for disposable gloves none of them has a special focus on allergies. Asthma Allergy Nordic wishes to address this aspect for disposable nitrile gloves with these criteria.

Asthma Allergy Nordic aims to help consumers who are already sensitized, or consumers who want to be extra careful, by making it easy to choose a product where the risk of getting an allergic reaction on the skin or respiratory system is minimised. Asthma Allergy Nordic has increased focus on asthma, where relevant, and people with hypersensitivity may feel, that labelled products help them, too.

With an *Asthma Allergy Nordic* label on disposable nitrile gloves, you get:

- No fragrance
- No sensitizing preservatives (e.g., MIT)
- No sensitizing rubber chemicals
- Minimal risk of allergic reactions on the skin

## The Definition of Allergenic Substances

Asthma Allergy Nordic requires that no substance in direct contact with the skin and/or mucous membranes may be regarded as sensitizing. **Note**, that a substance is not considered to be present if the amount of the substance is below 0.1 ppm in the final product. To assess whether a substance is considered an allergen, the following is taken into consideration:

- Is the substance classified with a harmonised classification as a skin sensitizer according to the EU CLP Regulation (1272/2008/EC)?

- Is there other documentation presented to prove the potential of the substance to sensitize the skin and/or mucous membranes? This could be the case if…:
    - There may be published articles on cases where allergic reactions have been reported over a period and where the clinical relevance has been established.
    - There may be epidemics where a lot of cases are reported over a short period of time towards a specific substance.
    - There may be substances where dermatologists experience allergic reactions in consumers towards a specific substance, and it is assumed that the actual number of cases is higher due to the substances not being in the baseline test series.
    - There may be a constant number of consumers having a positive reaction when tested. This will be set in relation to the usage of the substance both in terms of amounts and groups of consumers.
    - The substance is notified through REACH with classification as a skin sensitizer by several notifiers.

The above bullets will often – with the exception of a harmonised classification – have to be evaluated under more than one point to confirm the conclusion of the assessment.

The definition of whether a substance is sensitizing or not is not well-defined and grey areas may arise. In such cases, Asthma Allergy Nordic will consult our network of experts from the Nordic countries and international dermatologists and allergists with expertise within the field. The baseline in the assessment of substances will be cautious to protect the majority of consumers with contact allergy or respiratory issues and also to help consumers who want to be extra careful. At the same time, Asthma Allergy Nordic acknowledges that for a small group of people, this will not be a guarantee against having an allergic reaction to a given product. It is important to emphasize that even though a substance is not considered to be an allergen, there may be a minority that is/might be allergic to the substance and may have an allergic reaction towards this.

## Which Products May Be Labelled?

Products covered by these criteria are disposable gloves made of nitrile (also referred to as "*synthetic latex*"), intended for personal use such as coverage, or barrier function. Such products aim at protecting the user from direct skin contact with chemical, biological, or otherwise potentially harmful substances or agents. It is the glove and its material that is assessed, not its performance.

### Products not Included in the Criteria

At present, only disposable nitrile gloves are included, which means that disposable gloves of other materials, such as natural rubber latex (NRL) or vinyl, are excluded from the product group. Other elastic products and materials are also not included at present.

## Criterion 1 – Information on Product Composition

Asthma Allergy Nordic needs the full composition of the product as well as any process chemicals and finishing agents that may be present in the final product in order to properly assess the product's eligibility for the allergy label. The composition should be based on the content of the finished, ready-to-use product, including all known residuals and impurities, including but not limited to substances formed during vulcanization.

Process chemicals may include treatment, finishing, donning, and storage aid (e.g., treatments and auxiliaries that help prevent mould/fungal growth and similar during storage/shipping/transport). The reason for this degree of detail is that even very small amounts of a given substance may cause an allergic reaction to the skin. To ensure easy identification, the substances should be stated with a clearly identifiable name such as INCI or chemical name and supplemented with the CAS number (cas-no.). Should the composition of raw materials not be known to the applicant, the name of the raw material can be stated instead with a mention of the supplier's name. Subsequently, the necessary information will be obtained directly from the relevant supplier.

This information will not be used for public declaration but solely for assessing the product. Obtaining such information may be difficult for the manufacturer as the suppliers regard this information as confidential. Suppliers may send the information directly to Asthma Allergy Nordic and, if necessary, a confidentiality agreement will be signed with the suppliers and sub-suppliers. Asthma Allergy Nordic may help collect the required information. However, it is always the responsibility of the applicant to make sure all the necessary information is provided for the assessment and that this information is the correct information relating to the product application.

**Requirement 1**

The full composition of the product must be disclosed to Asthma Allergy Nordic including name of the product, optionally product ID/composition ID, all raw materials, residuals, impurities, auxiliaries, finishing agents, and process chemicals.

- Single substances must be stated by chemical name (IUPAC)/INCI, cas-no., active amount, and function.
- Raw materials must be stated by trade names, supplier name, amount, and function, provided the composition is disclosed by the supplier. It is the responsibility of the applicant that the suppliers provide the necessary information on the raw material to Asthma Allergy Nordic.

*Ingoing substance/ingredient is defined as all substances/ingredients in the product/raw material stated down to 0.1 ppm in the final product or component.*

***Documentation***: Identification of all ingoing ingredients, process chemicals, and finishing agents as mentioned above.

**Note**, that it is the obligation of the applicant to inform of all aspects relevant for the assessment of the product, e.g., information on contaminants/impurities in raw materials and/or final product.

**Name of the product** is the name under which the final product is sold to the consumers.

**Product ID/Composition ID** is used by some manufacturers to identify a specific product in the production. Information on product ID/composition ID is not mandatory and should only be provided if the applicant believes it will ease identification and communication in the application process.

**Name of raw material** is the trade name under which a given raw material is sold from the supplier of the raw material. It must be provided since additional information may be needed for some raw materials. Hence, it is important to know precisely which raw materials are used in the manufacturing process.

**IUPAC** is an abbreviation for *International Union of Pure and Applied Chemistry,* and it has a standardized nomenclature for naming chemical substances.

**INCI** is an abbreviation for *International Nomenclature of Cosmetic Ingredients* and is the name of the ingoing substances that must be in the product declaration (ingredient list) of cosmetic products according to the Cosmetic Regulation. INCI may be found on the European Commission website CosIng. [CosIng].

**CAS-no.** is an abbreviation for *Chemical Abstract Service Number* and is a way of identifying substances. Cas-no. should be a unique identifier for a substance, but this is not always the case. Some groups of substances have multiple cas-no.'s, and some cas-no.'s cover multiple substances. In many cases, a cas-no. does help identify substances and must therefore be stated in the composition to avoid misinterpretations.

**Active amount** is the amount of the substances in a raw material or product excluding water. It may be referred to as active concentration as well.

**Function** is the purpose for which a substance or raw material is present in the product.

**Ingoing substance** is defined as all the substances present in the product such as active substances, auxiliaries, solvents, and the like, but not impurities in the raw materials. A substance is considered not to be present if the amount is below 0.1 ppm in the final product.

**Auxiliaries and solvents** are considered as ingoing substances since they may vary from raw material to raw material and therefore cannot be expected or predicted in a specific raw material.

**Impurities** are part of the assessment regarding the risk of allergic reactions, see more of this under req. 2. Impurities are not considered as ingoing substances. However, they may occur in the final product due to content in ingoing substances and raw materials, from process chemicals, or from the manufacturing process of the product. Impurities may have different origins and may be the reason that a raw material cannot be accepted in products labelled with Asthma Allergy Nordic. It will always be the responsibility of the applicant to inform of a known content of impurities in the raw materials, even though they are not considered as ingoing substances. Impurities migrating from packaging into the product are also included in this definition.

**Process chemicals** are substances or mixtures used during the manufacturing process. These substances may be "used" or "consumed" during the production leaving only traces or residuals. However, many substances that are sensitizing cause sensitization even in very low amount, and even trace levels may be relevant when considering exposure of individuals with allergy towards those substances. Process chemicals are therefore assessed as an ingoing substance in the evaluation of the product.

**Finishing agents** may be added during the manufacturing process or as a separate process after production. Finishing agents may serve different functions, e.g., ease separation of the gloves from each other. Finishing agents are considered as a part of the final product.

## Criterion 2 – Specifically Limited or Excluded Substances

Some substances used in disposable nitrile gloves may be problematic with regards to contact allergy. These substances need to be limited or excluded entirely.

### A. Substances Classified Sensitizing to Skin, H317

The aim of Asthma Allergy Nordic is not only to prevent induction of contact allergy but also minimise the risk to consumers already sensitized from getting allergic reactions when using disposable nitrile gloves. The use of sensitizing substances in products labelled with Asthma Allergy Nordic is therefore excluded entirely – regardless of concentration (***note***, the defined lower limit of interest in "The definition of allergenic substances"). This requirement includes all substances with a harmonised classification as skin sensitizer (H317).

### B. Substances Where Alternative Evidence of Contact Allergenic Potential Exists

Some substances are considered sensitizing by dermatologists even though the substances are not classified as such. These substances are considered the same way as substances with a harmonised classification (see above). Another way to qualify under this definition, is described in more detail in the introduction section "The Definition of Allergenic Substances".

It is also possible to ask Asthma Allergy Nordic to assess a specific substance if an assessment should not already be available.

#### *Rubber Chemicals*

A specific group of substances used in disposable gloves are known to cause allergic reaction in sensitized people. These are generally referred to as "*rubber chemicals*" and may be used as accelerators, antioxidants, stabilizers etc. in the manufacturing process. Not all these substances are classified as skin sensitizers and will therefore not fall under the criterion excluding classified substances. However, for some of the rubber chemicals there is alternative documentation available identifying them as allergens. Below, you will find examples of rubber chemicals that do not have a

harmonised classification as skin sensitising, that have already been assessed and are excluded in disposable nitrile gloves labelled with the Asthma Allergy Nordic label (see Appendix 2 for assessment):

- 1,3-diphenylguanidine (DPG) (102-06-7)
- dimethylthiocarbamylbenzothiazole sulfide (DMTBS) (3432-25-5)
- diethylthiocarbamylbenzothiazole sulfide (DETBS) (95-30-7)
- p-tertiary butyl catechol (TBC) (98-29-3)

## C. Fragrance

Fragrance allergy is a frequent allergy and correlates with exposure to fragrance substances. A general limitation in exposure may therefore help limit the risk of developing fragrance allergy, help those who are already suffering from fragrance allergy, and people with hypersensitivity may feel the limitation helps them too. The “No fragrance” claim is a hallmark of the allergy label, and it is therefore very important that fragrances are not present in allergy labelled products.

However, handling this in practice is complicated as there is no precise definition of “fragrances” or “fragrance substances”. There are published reports that may help identify fragrances, but they are not exhaustive. When assessing the product, Asthma Allergy Nordic will make assessments of each ingoing substance and decide if a substance is considered a fragrance or fragrance substance. The applicant must also make this decision when stating the function of the ingoing substances.

So, even if the requirement itself is very simple, the documentation and assessment may be complicated. It may help applicants to check their potential fragrances against the references mentioned here: [SCCS/1459/11], [de Grout 2019], [The Complete IFRA Standards, 2022]. This will not necessarily be sufficient, but it may give an indication. It is also possible to have Asthma Allergy Nordic assess a specific substance if an assessment should not already be available.

## D. Residual monomers

Polymers, such as nitrile, may contain residual monomers. Some monomers are considered sensitizers even if the polymer itself is not considered as such, and therefore the presence of these monomers is unwanted. In some cases, it will be difficult to avoid the unwanted residuals, and therefore those impurities/residuals may be tolerated as present in the product. However, this will require a suitable limit based on a risk of the allergenic potential and possibly a combination with technical solutions.

Acrylonitrile is one of the monomers used for making nitrile and it is classified as skin sensitizing (H317). Hence, acrylonitrile is unwanted in the final product. However, it is very hard to ensure total absence of residual acrylonitrile in the finished polymer. [Wakui et el 2001]. Therefore, a small amount of residual monomer is accepted in the final nitrile gloves.

The tolerated level of residual monomer is based on several considerations. One being a comparison to the accepted level of sensitizing monomers in allergy labelled paint, in which monomers are accepted up to 100 ppm. However, the fact that paint is not intended for skin contact was taken into account when setting this limit. In contrast, nitrile gloves are in skin contact for a considerable length of time as

well as creating an environment for the skin that is challenging due to raised levels of heat and moisture. Another consideration is, that [Wakui et al 2001] has investigated the level of residual acrylonitrile in nitrile gloves and found it generally lies below 1 ppm. Finally, [Aerts et al 2023], tested an individual with a known allergy to acrylonitrile and found that the individual had no allergic reactions to a concentration of 0,001% (10 ppm) acrylonitrile.

Based on these considerations, a content of residual monomer below 1 ppm (< 1 ppm) in the final product is accepted as it lies below the amount causing allergic reactions in a sensitized individual.

The requirement must be documented by a test of the final product. The test must be made on three different batches and must be documented continuously. This means that Asthma Allergy Nordic may ask for documentation that the requirement is met even after awarding the certification. This may be part of the continuous compliance control or based on suspicion of non-compliance.

### E. Purity of certain raw materials

Impurities may be part of raw materials whether these are of natural or synthetic origin. Common for the impurities is that they are mostly present due to natural content or process residuals, and thus are known for the specific raw material. This means that the impurities are part of the assessment, when it is decided that the raw material may be accepted in products with Asthma Allergy Nordic. This is where the definition of “impurity” differs from “auxiliary”. However, the presence of impurities may vary, and it is always the responsibility of the applicant to notify Asthma Allergy Nordic of the impurities in any specific raw material. In the case of a raw material containing impurities that influence the assessment of the raw material, the acceptance of the raw material will be individual and based on the information submitted by the applicant.

Asthma Allergy Nordic assesses the raw materials and based on this assessment it is determined whether an impurity is acceptable, acceptable with limitations, or unacceptable. The assessments are based on whether the impurity is a sensitizer, and if it is considered possible to clean up or purify the raw material (fully or partially), and whether a safe limit may be established. Statements that the requirements are met will not be accepted without supporting documentation e.g., test results or the like.

**Requirement 2**

A. Substances classified sensitizing with H317 may not be part of the product or raw materials.
B. Substances, where alternative evidence of sensitizing potential to the skin exists, may not be part of the product or raw materials.
C. Substances considered as fragrance may not be part of the product or raw materials.
D. The final product must contain less than 1 ppm (< 1 ppm) of monomers that are considered sensitizing.
E. Raw materials containing contaminants or impurities that may be sensitizing to the skin must be purified to an extent where the raw material, and hence the final product, does not cause allergic reactions to the skin.

***Documentation***: Full formulation cf. req. 1.
*Especially for req. 2D*: this must be documented by an appropriate test made by an accredited laboratory using a suitable method. **Note**, that the detection limit used must be relevant for the requirement set.

## Criterion 3 – Finishing Agents

Finishing agents may have different functions, e.g., separating gloves from each other, and may be applied after or during production. Finishing agents used on the interior of the glove, is not accepted, since this will lead to an increased exposure of the user to chemical substances or mixtures and hence pose a risk of causing allergy or allergic reactions.

Finishing agents may be used on the exterior of the glove. If a powder is used on the exterior, the glove must be able to claim "powder free" according to EN455-3, to ensure that the amount of powder used is as low as possible.

**Requirement 3**

Finishing agents may be used only on the exterior of the glove. The product must be able to claim "powder free" according to EN455-3.

***Documentation***: Full formulation cf. req. 1. If powder is used as a finishing agent, the amount used must be stated in the product composition.

## Criterion 4 – Functional Additives

Disposable gloves may have additives in the form of lotions or powders or the like. Such additives may serve different functions, e.g., donning agent. These substances or mixtures will often be found on the inside of the glove in direct skin contact during the use phase. This means that the user is exposed to the additive during every usage, regardless of whether the additive is needed or wanted by the user.

Generally, it is advisable to minimise the contact of chemical substances in order to minimise the risk of inducing or eliciting allergic reactions. Therefore, such additives are not accepted in products certified by Asthma Allergy Nordic.

**Requirement 4**

Lotion or powder are not accepted in the final products.

***Documentation***: Full formulation cf. req. 1.

## Criterion 5 – Artwork/label

The use of the Asthma Allergy Nordic logo is subject to the requirements of the Logo Manual. [AAN Logo Manual]. Artwork/label must be presented so correct usage can be verified.

Claims on the product artwork/packaging within the area of interest of Asthma Allergy Nordic must also be approved. Artwork changes that concern areas not related to the logo, and our organization, do not require prior approval. However, Asthma Allergy Nordic must always be supplied with the current artwork to ensure traceability when communicating with both consumers and the manufacturer as well as controlling certified products.

**Requirement 5**

Artwork/label must be approved. The Asthma Allergy Nordic logo must be designed in accordance with the guidelines in the logo manual.

Claims within the area of interest of Asthma Allergy Nordic must also be approved.

***Documentation***: Current artwork/label.

# References


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# Appendix 1 – Criteria in Summery

**Requirement 1**

The full composition of the product must be disclosed to Asthma Allergy Nordic including name of the product, optionally product ID/composition ID, all raw materials, residuals, impurities, auxiliaries, finishing agents, and process chemicals.

- Single substances must be stated by chemical name (IUPAC)/INCI, cas-no., active amount, and function.
- Raw materials must be stated by trade names, supplier name, amount, and function, provided the composition is disclosed by the supplier. It is the responsibility of the applicant that the suppliers provide the necessary information on the raw material to Asthma Allergy Nordic.

*Ingoing substance/ingredient is defined as all substances/ingredients in the product/raw material stated down to 0.1 ppm in the final product or component.*

***Documentation***: Identification of all ingoing ingredients, process chemicals, and finishing agents as mentioned above.

**Requirement 2**

F. Substances classified sensitizing with H317 may not be part of the product or raw materials.
G. Substances, where alternative evidence of sensitizing potential to the skin exists, may not be part of the product or raw materials.
H. Substances considered as fragrance may not be part of the product or raw materials.
I. The final product must contain less than 1 ppm (< 1 ppm) of monomers that are considered sensitizing.
J. Raw materials containing contaminants or impurities that may be sensitizing to the skin must be purified to an extent where the raw material, and hence the final product, does not cause allergic reactions to the skin.

***Documentation***: Full formulation cf. req. 1.
*Especially for req. 2D*: this must be documented by an appropriate test made by an accredited laboratory using a suitable method. **Note**, that the detection limit used must be relevant for the requirement set.

**Requirement 3**

Finishing agents may be used only on the exterior of the glove. The product must be able to claim "powder free" according to EN455-3.

***Documentation***: Full formulation cf. req. 1. If powder is used as a finishing agent, the amount used must be stated in the product composition.

**Requirement 4**

Lotion or powder are not accepted in the final products.

***Documentation***: Full formulation cf. req. 1.

**Requirement 5**

Artwork/label must be approved. The Asthma Allergy Nordic logo must be designed in accordance with the guidelines in the logo manual.

Claims within the area of interest of Asthma Allergy Nordic must also be approved.

***Documentation***: Current artwork/label.

# Appendix 2 – Assessment of Rubber Chemicals (Alternative Evidence)

Some of the substances on the list given under requirement 2B. do not have a harmonised classification as skin sensitizing. However, Asthma Allergy Nordic has found sufficient evidence of the substances' sensitizing potential to exclude them from being present in products certified with the Asthma Allergy Nordic allergy label. The evidence is presented below.

## 1,3-diphenylguanidine (DPG) (102-06-7)

When searching the ECHA C&L Inventory, DPG has multiple notifiers and none of them consider DPG a skin sensitizer. This is further supported by the registration dossier, where there is a single study from 1995 that concludes DPG is not a skin sensitizer.

However, suspicion is raised, since DPG is mentioned along with other sensitizing rubber accelerators, and it is part of the special rubber mix for patch testing when rubber chemicals is suspected of being cause of an allergic reaction.

Searching through literature/internet, the following is found:

**SUBSTANCE EVALUATION CONCLUSION**

This report is made by a member state of the European Union under REACH article 48 and it assesses all available information on the substance in question. [ECHA 2020]. This report for DPG concludes that skin sensitization is an additional concern based on a thorough review of the test results and clinical studies made. The report therefore suggests that the classification as a skin sensitizer is added to the substance.

**Product Safety Assessment**

This is a short summarization of a DPG-product manufactured by Lanxess. [Lanxess 2015]. In this assessment Lanxess mentions that "Persons susceptible to allergic skin reactions may experience contact dermatitis as a result of direct contact with such products" indicating the sensitizing potential of DPG.

### *Conclusion*

Asthma Allergy Nordic consider 1,3-diphenylguanidine (DPG) as a skin sensitizer based on the evidence presented here. Most focus has been laid on the Substance Evaluation Conclusion made under REACH. It is a work done within the regulatory framework of REACH and a very thorough review is presented. Any other evidence is supportive but not conclusive on its own.

## Dimethylthiocarbamylbenzothiazole sulfide (DMTBS) (3432-25-5)

Dimethylthiocarbamylbenzothiazole sulfide (DMTBS) is not found in the ECHA C&L Inventory and does not have a registration dossier.

Searching literature/internet turns up some articles of concern:

**Reaction profile in patch testing with allergens formed during vulcanization of rubber**

Hansson et al finds that dialkylthiocarbamyl benzothiazole sulfides were good markers of both thiuram and mercaptobenzothiazole sensitivity. [Hansson et al. 2014]. Hansson et al added DMTBS and DETBS to the patch test series and found that all patients, except for 1, who reacted to any of the thiurams, dithiocarbamates or benzothiazoles also reacted to the mixed dialkylthiocarbamylbenzothiazole sulfides (DMTBSandDETBS).

**Patch testing with rubber series in Europe: a critical review and recommendation**

Warburton et al mentions DMTBS as a substance of concern in relation to allergy of rubber gloves. They do not recommend inclusion in the rubber test mix due to lack of information on applicability of the substance. [Warburton et al. 2016].

**Contact dermatitis caused by a new rubber compound detected in canvas shoes**

Hulstaert et al found DMTBS to be the culprit when faced with allergic reactions to canvas shoes. The article describes 18 patients with allergic contact dermatitis to canvas shoes, where four of the patients had positive tests to DMTBS. Patients reacted to very low concentrations of DMTBS and one reacted to as low as 0,1 ppm. [Hulstaert et al 2017].

**Patch test results in patients with suspected contact allergy to shoes: Retrospective IVDK data analysis 2009–2018**

Traidl et al mentions DMTBS as a new allergen that may be important but overlooked since it is not part of the rubber mix used for patch testing. [Traidl et al. 2021].

**Active sensitization to dimethylthiocarbamylbenzothiazol sulphide: An unexpectedly strong rubber contact allergen**

Isaksson et al investigated whether DMTBS and DETBS could be used as markers of contact allergy to common rubber additives and maybe even better markers than the ones used already. [Isaksson et al. 2023]. The results showed at the initial reading (Days 3 and 7), no reactions to DMTBS or DETBS. At retesting, 10 of the 68 (15%) patients reacted positively to lower concentrations of DMTBS than the initial test concentration. Seven of 8 also reacted to Tetramethylthiuram monosulfide (TMTM). Three of them had positive reactions to DEBTS. All 10 patients had reactions to more diluted solutions to DMBTS than to DEBTS.

The conclusion was that the results speak for patch test sensitization to DMTBS with cross-reactivity to TMTM and also DEBTS. DMTBS and DEBTS could be new markers of rubber allergy, but a safe test concentration must be found.

### *Conclusion*

Asthma Allergy Nordic considers dimethylthiocarbamylbenzothiazole sulfide (DMTBS) as a skin sensitizer based on the evidence presented here. Even if the substance is not part of the standard rubber mix for patch testing, recent investigations point to it being a potent sensitizer and possibly overlooked because of the none-inclusion in the patch test series.

## Diethylthiocarbamylbenzothiazole sulfide (DETBS) (95-30-7)

Diethylthiocarbamylbenzothiazole sulfide (DETBS) is found in the ECHA C&L Inventory but only with a single notifier and without a registration dossier. The data gained from this is insufficient and carries little weight.

[Isaksson et al. 2023] and [Hansson et al. 2014] also mention DETBS, and the conclusions made for DMTBS are also relevant for DETBS. In addition, this has been found:

**Contact dermatitis to a rubber allergen with both dithiocarbamate and benzothiazole structure**

Bergendorff & Hansson find diethylthiocarbamylbenzothiazole sulfide (DETBS) as the culprit allergen in a case, where a young man gets allergic reactions from his diving mask. [Bergendorff & Hansson 2007]. They also note that DETBS is interesting due to the fact that it has structural similarities to other known sensitizers, dithiocarbamate and benzothiazole.

### *Conclusion*

Asthma Allergy Nordic considers diethylthiocarbamylbenzothiazole sulfide (DETBS) as a skin sensitizer based on the evidence presented here. Even if the substance is not part of the standard rubber mix for patch testing, recent investigations point to it being a potent sensitizer and possibly overlooked because of the none-inclusion in the patch test series.

## p-tertiary butyl catechol (TBC) (98-29-3)

When searching the ECHA C&L Inventory, TBC has multiple notifiers and a majority of them considers TBC a skin sensitizer. This is further supported by the registration dossier, where there is two studies from 1999 and 2003 respectively that concludes TBC is a skin sensitizer. One of the studies mentions TBC to be a potent sensitizer. [ECHA C&L Inventory].

Safety data sheets for TBC also mentions a classification as a skin sensitizer (H317).

Additional search gives the following supportive evidence:

**Patch-test Reactions to Plastic and Glue Allergens**

Article by Kanerva et al. mentions TBC as one of the most common rubber chemicals to cause allergic reaction with 2.6% of patients having positive reactions to this substance. [Kanerva et al. 1999].

## *Conclusion*

Asthma Allergy Nordic considers p-tertiary butyl cathecol (TBC) as a skin sensitizer based on the evidence presented here. Most focus has been laid on the notifications made in the ECHA C&L Inventory under REACH. Any other evidence is supportive but not alone conclusive.