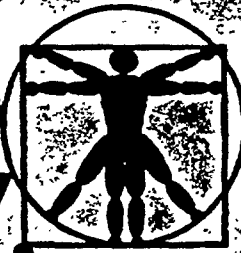


Health by Design



54th All-Ohio Safety Congress
& Exhibit, April 24, 25, 26, 1984

PLAINTIFF'S
EXHIBIT
BRK-97

Richard F. Celeste, Governor

Leonard T. Lancaster, Chairman, The Industrial Commission of Ohio
John A. Pompei, Superintendent, Division of Safety and Hygiene
Mary E. Horvath, Congress Coordinator

April 26, 1984

Legal Section
Industrial Commission of Ohio
246 North High Street
Columbus, Ohio 43215

Re: OD 829254-22
Jerry Holston
General Motor Corporation
Fisher Body Division
Mansfield Plant
2525 W. 4th Street
Mansfield, Ohio

Attn: Judy Spencer

Dear Ms. Spencer:

The following report on the Occupational Disease claim of Jerry Holston (829254-22) is based on information obtained concerning the cleaner the claimant used and its relationship to the alleged injuries received by him on October 10, 1983.

Mr. Holston has been employed as a janitor by Fisher Body Division, General Motors Corporation, Mansfield Plant, 2525 W. 4th Street, Mansfield, Ohio since 1978. On October 10, 1983, he was spray applying an industrial cleaner (IC-115, Spartan Chemical Company) to locker room walls. The following morning, he discovered skin irritation over certain areas of his body. The condition was subsequently diagnosed as an erythmic skin reaction, possibly allergic in nature.

The product's manufacturer stated that the industrial detergent complex (IC-115) contained isopropyl alcohol, potassium hydroxide, sodium nitrilo acetate, wetting agents, and water. This product does not contain Butoxyethanol.

The following comments pertain to the toxicological action of these ingredients, and their relationship to dermatitis.

Isopropanol: According to Patty's Industrial Hygiene and Toxicology (Vol. 2C), "Reports of adverse effects on humans are relatively few in view of the widespread use of isopropyl alcohol. . . . Although Nixon

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et al. tested IPA on the skin of six human subjects and found its irritancy to be negligible, a few cases of dermae irritation and/or skin sensitization have been reported.

Potassium Hydroxide: This compound is extremely alkaline in nature and is very corrosive to body tissues. Dermatitis may result from repeated exposure to dilute solution in the form of liquid dusts, or mists.

Sodium Nitrilo Acetate or Nitrilo-triacetic Acid (NTA): There is no established permissable exposure limit on this substance, nor information on route of entry. The following on NTA and its relationship to dermatitis was taken from "Contact Dermatitis - Vol. 6 (5), 1980: "Nitrilo-triacetic acid (NTA) is another chelating agent made of formaldehyde, sodium cyanide and ammonia. When of technical quality it contains hexamethylene tetramine. We have confirmed that formaldehyde is present in technical NTA . . . The amount of formaldehyde may of course vary between batches . . . The risk of sensitization is probably small but there is a potential risk of elicitation of dermatitis in previously sensitized people."

In summary, there appears to be a dermatitis potential, both contact and allergic, with use of this product, due to its alkalinity (Ph-130) and action of the individual ingredients. More definitive testing could be conducted on the claimant to determine his sensitivity to these ingredients.

Respectfully submitted,

Sharon S. Adams
Sharon S. Adams
Industrial Hygienist

SSA/rl

Formaldehyde in technical EDTA and NYA

S. FREOET AND B. GRAUVERGER

Department of Occupational Dermatology, University Hospital, S-221 85 Lund, Sweden

A woman aged 51, cleaning in a hospital, developed severe hand and forearm dermatitis after 8 years. ICDRO patch test gave positive reaction to formaldehyde. The cleaning agents were checked for formaldehyde (Blohm 1959). One of these contained formaldehyde. This was not suspected because the contractors are bound to guarantee that the products should be free of formaldehyde. Then it was found that one constituent, the chelating agent sodium salt of ethylenediamine tetraacetate (Na_4EDTA) contained formaldehyde.

For this reason we made inquiries of some EDTA manufacturers to get some information on the production and purity of this compound. EDTA is made of formaldehyde, ethylenediamine and sodium cyanide. It is supplied as a powder or a liquid. Formaldehyde and/or the formaldehyde releaser hexamethylenetetramine are present in varying amounts. We have confirmed that formaldehyde is present in technical EDTA. EDTA as used in medicaments is purified and does not contain formaldehyde.

Examples of technical application: Soaps, detergents, shampoos, disinfectants, metal cleaning, textile processing assistant, heat exchanger, leather, photography. EDTA occurs under several brand names, e.g. Verene, Sequestrene, Rexene, Tetrine, Kalex, Trilon B,

Komplexon, Nullapon, Aquamollin, Complexone, Distol 8, Irgalon, Calcol, Syntes 12 a, Tyclarosol, Nervanal B.

Nitro-triacetic acid (NTA) is another chelating agent made of formaldehyde, sodium cyanide and ammonia. When of technical quality it contains hexamethylenetetramine. We have confirmed that formaldehyde is present in technical NTA. It is supplied as a powder or a liquid. Examples of technical application: Heavy duty liquid detergents, boiler water treatment.

The amount of formaldehyde may of course vary between batches. It is probable that the present patient was sensitized by formaldehyde in a cleaning agent. The risk of sensitization is probably small but there is a potential risk of elicitation of dermatitis in previously sensitized people. Manufacturers of products containing EDTA and NTA are not always aware of the presence of formaldehyde in their products.

Reference

- Blohm, G. (1959) Formaldehyde contact dermatitis. *Acta Dermato-venereologica* 39, 450-453.

Contact Dermatitis Vol 6 (52) 1980 p.366

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SYNTHETIC RUBBER MANUFACTURE Sodium tal-
w soaps and detergents are employed in bu-
diene rubber manufacture to emulsify the in-
redients during processing.

PAINT MANUFACTURE Detergents emulsify
nthetic resins in aqueous media for the man-
ufacture of water-based paints.

LUBRICANTS Detergents are used in hy-
draulic oils to prevent sludging in engine parts.
lost heavy-duty greases are composed of heavy
etals with nonionic detergents.

CUTTING OILS In water-soluble cutting oils,
detergents are used as emulsifiers, while cation-
c detergents are used as germicidal agents.

PLASTICS MANUFACTURE Polymerization takes
place more rapidly in detergent solutions; soaps
were the first surfactants used to mass produce
the vinyl polymers.

MISCELLANEOUS USES Detergents are used in
printing inks; in waterproofing solutions for
wood and concrete; as a degreaser prior to dyeing
leather; in furniture cleaners and polishes; as
antifog agents; in fire-fighting foams; in dust
preventatives; and in antistatic agents. The list
grows longer and more impressive each year,
and in fact there are few industrial processes
where soaps or detergents are not used in some
way.

Contact Dermatitis from Soaps and Detergents

Workers in the soap and detergent industry can
develop dermatitis from handling strong alkali-
es and rancid oils, but this is very uncommon
today because almost all the systems used are
closed. In addition, the companies manufactur-
ing soaps and detergents are among the most
safety-conscious in the United States.

In other industries, however, cleaning agents
cause a significant amount of contact dermatitis
every year. In 1953 Schwartz ranked the causes
of occupational dermatitis among 41,628 work-
ers, and cleaning agents were among the lead-

ing ones. Klauder (1962) summarized the "ac-
tual causes of certain occupational dermatoses"
in 3229 workers from 1943 to 1962 and reported
that water, soap, and alkali detergents were
responsible for 796 cases—over 24 percent of
the total. Aggravation of existing skin disease
by the use of soaps and detergents is an addi-
tional factor not usually accounted for in such
statistics. The incidence of occupational der-
matitis due to soaps is probably the same today
as it was in 1955.

Cleaning agents designed for uses other than
skin cleaning may contain a variety of irritating
substances. Certain laundry products contain
sodium fluorosilicate, for example, which is a
powerful irritant. A well-known fabric rinse
contains 4% ammonium silicofluoride, which
can be irritating to the skin. Floor cleaners, with
as much as 50% sodium carbonate, 36% sodium
metasilicate, and 5% sodium hydroxide, can be
extremely caustic, producing burns and tissue
destruction. Many carpet cleaners contain for-
malin as well as various solvents. Some toilet
bowl cleaners contain as much as 35% formal-
dehyde and 25% hydrochloric acid. Glass clean-
ers may contain formalin, ammonium hydrox-
ide, and a variety of solvents. Certain household
liquid dish detergents have as much as 0.3%
formalin. Oven cleaners are very corrosive when
accidentally spilled onto the skin, containing
approximately 5% sodium hydroxide, 1% am-
monium hydroxide, and surfactants to remove
grease, which also dissolve keratin in the skin.
Scouring powders usually have silica powder
as the abrasive, with an anionic detergent, a
phosphate builder, and other substances that
are irritating to the skin.

Dermatitis from cleaning agents may be caused
by (1) excessive use, (2) the presence of abrasive
or irritating materials, and (3) development of
contact or photocontact allergy to soaps and de-
tergents. Allergic dermatitis unrelated to pho-
tosensitivity is rare.

Most household soaps and detergents have a
primary irritant effect under certain conditions,
mostly from extreme use, but under conditions
of ordinary use normal skin is not irritated. Soaps
and anionic synthetic detergent products used
for skin cleaning, have an average pH of ap-
proximately 9.5 when in solution, and when
soap is excessively used for several days, the
skin pH rises to about 8 and remains there as
long as cleaning continues (Klauder and Gross,

1951). Wahlberg (1969) showed that absorption through the skin for hexavalent chromium, for example, is greater in an alkaline pH, and the same may be true for other chemicals as well. Bettley (1972) has suggested that the persistent alkaline pH of soaps and detergents may also predispose the skin to bacterial infection.

Workers required to contact large amounts of soap and detergents continuously in their work include dish washers, bartenders, cannery workers, textile workers, janitors, maids, cooks, food handlers, typists, mimeograph operators, nurses, physicians, dentists, and dental assistants. Dermatitis is common among these people, but the role of contributing factors such as skin dryness, atopic dermatitis, a cold working environment, decreased absolute humidity, and simultaneous exposure to solvents must also be considered.

Specific ingredients of soaps and detergents that cause dermatitis are as follows.

OPTICAL WHITENING AGENTS

In 1968 and 1969 Osmundson reported an "epidemic" of contact dermatitis in 167 patients in Denmark due to a recently introduced optical brightener, a mixture of 2-pyrazoline derivatives (Osmundson, 1969, 1972; Osmundson and Alani, 1971). All patients had a positive patch test to the brightener at 0.1%–1.0% in yellow petrolatum. Pruritus, especially at night, was predominant, and the eruption was similar to that seen in textile dermatitis, affecting the inner aspect of the upper arm, the axilla, and the volar forearms. An unusual reticulate pigmentation was seen in some patients (Osmundson, 1970). The offending brightener was withdrawn from the world market and has not been used since. The usual optical brighteners are stilbene derivatives, and dermatitis has so far not been reported from their use (Gloxhuber and Bloch-ing, 1978).

PROTEOLYTIC ENZYMES

Although dermatitis from these enzyme additives was reported about a decade ago (Ducks-bury and Dave, 1970; Jensen, 1970; Shapiro, 1971), there have been no additional reports since then. Zachariae et al. (1973) analyzed a large group of workers occupationally exposed and found the effect to be irritant in nature, not allergic as suspected. A problem with these en-

zymes did occur in the lungs of workers ex-posed to high concentrations in the early days of manufacture of enzyme-containing deter-gents (Flindt, 1960; Gothe et al., 1972; New-house and Tagg, 1970), but today the problem has largely disappeared. Proteolytic enzymes are found today in only three or four commer-cial all-fabric household laundry bleaches sold in the United States (Weaver, 1981), but as re-cently as 1970, 70–75 percent of the laundry de-tergent products contained these enzymes. De-pending on the brand and type, they had up to 0.1% of active enzyme (Carter and McMurray, 1970). Extensive studies on oral toxicity, cuta-neous sensitization potential, and skin and eye irritation were conducted in the late 1960s with-out finding adverse effects (Griffith et al., 1969).

SULTONES

A severe allergic contact dermatitis from a dishwashing liquid suddenly occurred in Nor-way in 1966 (Magnusson and Gilje, 1973). Some of the patients had systemic symptoms, such as nausea, fever, and a peculiar kind of mental depression. The causative agent was not dis-covered at first, but from patch testing it was soon found that the substance was a component of the lauryl ether sulfate fraction. The total number of cases reached approximately 1000 out of an exposed population of from 200,000 to 500,000 persons. The cutaneous reaction was severe, and the hands and arms were most af-fected, with papules, vesicles, and often pur-pura. Some cases required hospitalization. A similar outbreak occurred in Denmark in 1971 (Sylvest et al., 1975).

The allergen was later found not to be lauryl ether sulfate, but an accidental contaminant added during manufacturing: 1-dodecene-1,3-sultone, and 2-chloro-1,3-dodecane sultone and their C_{14} homologues (Connor et al., 1975). The sensitizing properties of these sultones were found to be stronger even than 1-chloro-2,4-dinitrobenzene (DNCB), which is one of the most potent contact sensitizers known (Ritz et al., 1975).

PERFUMES

In his study of balsams, Hjorth (1961) found that 50 percent of Scandinavian patients sen-sitive to balsam of Peru on patch testing were also sensitive to perfumes in soap. Rotenburg

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