



Authoritative facts about the skin from the [New Zealand Dermatological Society Incorporated](#).

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Chrome allergy

What is chrome and where is it found?

Most people relate chrome to the bright, shiny and durable finish of some metal products. However, contact with chrome-plated objects is an unlikely cause for chrome allergy. It is the chromium salts (chromates) used as an ingredient in the manufacture of many other products such as cement, mortar, leather, paints and anticorrosives that are the cause of chrome sensitivity. Most exposure is via the workplace, principally from cement and mortar used in the building industry, but is not limited to this. The table below shows some of the many sources of chromates and where or how we may come into contact with them either at home or at work.

Home/personal sources	Work sources
<ul style="list-style-type: none"> • Chrome-tanned leather goods including shoes, gloves and other wearable items and accessories • Cosmetics containing chromate-containing pigment (usually yellow-green colours) • Disinfecting and bleaching agents where chromates are used for colour and stabilizing properties • Safety matches, chromates commonly found in unlit and charred match heads • Green felt fabric used to cover snooker and card tables, chromates used in fabric dye • Paints, chromates used in anti-rust primer paints and also in the pigments for green-yellow paints • Tattoos containing chromate-containing pigment (usually yellow-green colours) • Radiator coolants, chromates used to stop rusting • Internal exposure from dental or orthopaedic implants that contain chromates • Chrome-plated materials, unlikely to be the cause of allergic dermatitis. Further investigation usually reveals nickel as the offending agent 	<ul style="list-style-type: none"> • Allergic cement dermatitis is usually due to dichromates found in cement and is highest amongst workers handling wet cement • Primer paints containing zinc chromate and chromate dip to prevent corrosion of nuts and bolts is a cause of chromate sensitization in the automobile industry • Metal workers and welders of chromium steel alloys • Diesel locomotive radiator fluids, chromates used to prevent rust or radiators and pipelines • Plaster-like mixtures used in building repairs contain chromates • Dyemakers, colour makers, paint makers, painters, basically any one who is exposed to pigments containing chromates • Engraving solutions • Pulp and paper industry • Artificial flower makers • Photographic workers • Pottery workers • Woodworkers • Explosives workers



Positive patch tests to potassium dichromate



Hand dermatitis due to contact with cement

What are the reactions to chrome allergy?

Reactions to contact with chromates in an allergic individual include [allergic contact dermatitis](#) and irritant dermatitis. It may cause an airborne contact dermatitis. In addition chrome exposure may lead to ulceration of the skin and perforation of the nasal septum. Chrome ulcers and nasal septum perforation are most commonly seen in industrial exposure cases and may occur without accompanying allergy to chromates.

Features of chrome ulcers and nasal septum perforation

- Chrome ulcers or " chromeholes " are typically crusted, painless lesions revealing a 2–5mm pitted ulcer covered with exudate
- Most commonly occur on exposed parts of the body, mainly the hands, forearms and feet. They also develop readily at the site of insect bites, sores or other injuries.
- Initially nasal septum ulceration may be painless but with continued exposure the necrotizing effect of chromates to underlying tissues may become painful and lead to permanent scarring and disfigurement
- Still commonly found in workers exposed to strong chromate solutions in electroplating, tanning and chrome-producing manufacturers

Cement dermatitis is most prevalent in construction workers but may occur in artists, DIY homebuilders or other individuals who are exposed to cement through work or a hobby. Dichromates in cement are not the only cause of cement dermatitis, they only account for the allergic contact dermatitis reactions. Primary irritant reactions of cement dermatitis include dryness and fissuring of the skin caused by the drying (hygroscopic) properties of cement, and injury or ulcers to skin caused by mechanical irritation due to rough silica particles in cement. Individuals can develop cement dermatitis after working for many years without any problems.

Am I allergic to chrome?

Chrome allergy is diagnosed from the clinical history and by performing special allergy tests, i.e. [patch tests](#), using a solution of potassium dichromate.

Features of a positive patch test to potassium dichromate ion

- Patch test site itches rather than burns
- Reaction is papulovesicular
- Reaction may spread beyond the borders of the original patch test site
- Reaction persists for at least 3 days

It appears that chrome dermatitis can persist in people even after they change occupations and are no longer exposed to chromates. Approximately two thirds of those sensitive to chromates will still be allergic even when tested several years later. The reason is unknown but it may be that chromates may take a long time to leave the skin.

Management of chrome allergy

Avoidance is the only long-term management strategy for chrome allergy. Dermatitis caused by chromates can become a chronic debilitating problem so early diagnosis, followed by measures taken to minimize exposure or cease all contact with chromates is key to the management plan. De-sensitisation or hardening to chromates should not be relied upon.

Once the dermatitis appears on the skin, treatment is as for any acute dermatitis/eczema, i.e. topical corticosteroids, emollients, treatment of any secondary bacterial infection (*Staphylococcus aureus*), etc. Because chromate dermatitis is prone to dryness and fissuring, secondary bacterial infection is a real concern and a broad spectrum topical antibiotic preparation is usually used in conjunction with anti-eczema treatment.

Where avoidance is not achievable, several methods have been used to try to minimize exposure.

Methods to minimize chromate exposure

- Wear protective clothing and employ no-touch techniques
- Addition of other chemicals (e.g. iron sulphate or combination of barium hydrate, nitrate and chloride with lead acetate) to cement or mortar to neutralize the chromate content
- Application of a barrier cream made from ascorbic acid (vitamin C) and EDTA (a chemical which binds metals)
- Impregnation of ascorbic acid into filters of respirators enhances protection against inhalation of chromate dust, particularly useful in chromate-sensitive printing and lithography workers
- Use of disposable hand towels by workers in the chromate industry to avoid cross contamination
- Thoroughly wash all clothing contaminated with chromates

What should I do to avoid chrome allergy?

In the workplace try to avoid exposure to chromates, however this may not be practicable thus use measures to minimize exposure as described above. Identify potential sources of exposure using Material Safety Data Sheets; these are required for all chemicals and substances that you may come into contact with in the workplace.

Outside of the workplace, the best way to avoid chrome allergy is by being aware of the possible sources of chromates. Wearing thick socks and reducing foot perspiration may help to reduce chromate-induced shoe dermatitis. Use only cosmetics that you know do not contain chromates. Avoid direct contact with matches and do not keep matches in clothing pockets. Thoroughly wash all clothes contaminated with chromates.

If you must use products that contain chromates, wear appropriate gloves or other protective clothing to avoid contact with your skin. Your dermatologist may have further specific advice, particularly if you are highly sensitive to chromates.

Alternative names for chrome

Chrome is also known by several other names. These include:

- Chromates
- Chromium
- Chromium salt

- Potassium dichromate
- Chromium sulphate
- Chromite

Avoid all of these. At work, request a material safety data sheet to help identify alternatives that are safe hence avoiding contact with material containing chromates.

Further information

CAS number: 7778-50-9

Formula: Cr₂K₂O₇ (hexavalent form of chromium)

Cross reactions:

- Cobalt
- Nickel
- Trivalent chromium compounds

Sensitizer:

Main sensitisers are the dichromates

Patch Test:

0.5% potassium dichromate in petrolatum

Sources of Exposure to Chrome		
<ul style="list-style-type: none"> • Anticorrosives • Anti-rust coatings • Anti-rust primer paints • Ashes • Artificial flowers • Batteries • Bleachers • Boiler linings • Ceramics • Cigarettes • Cement • Coolant oils • Cosmetics (mascara/eye shadow) • Cutting oils • Defatting solvent • Detergents and bleaches • Dyes (textile) • Enamel • Engraving solutions 	<ul style="list-style-type: none"> • Explosives • Fabrics • Foundry sand • Furniture polishes • Glues • Green baize for cards, snooker, billiard table tops • Homeopathic drugs • Ink • Leather goods (e.g. gloves, shoes, hats, wallets, bags, clothes) • Magnetic tapes • Matches (safety) • Metal alloys • Milk testers • Mortar • Newspaper • Offset printing • Oil from metal working • Orthopaedic pins or screws • Pacemaker 	<ul style="list-style-type: none"> • Paint • Paper (photocopy paper) • Photography • Polishes & waxes (shoes, floor, etc) • Postage stamps • Quicklime • Refractory materials • Rubber gloves • Shoe polish • Shoes • Solvent • Surgical (chromic) gut suture • Tattoo dye • Test reagent (laboratory) • Textile dyes • TV screens • Welding • Wood preservatives

Reference

Book: [Fisher's Contact Dermatitis](#). Ed Rietschel RL, Fowler JF. Lippincott Williams & Wilkins 2001

Related information

On DermNet NZ:

- [Dermatitis](#)
- [Allergic contact dermatitis](#)
- [Patch testing](#)

Other websites:

- [T.R.U.E. Tests](#): this site provides a wide range of information on contact dermatitis and contact allergy testing
- [AllAllergy.Net](#): allergy and intolerance information resource
- [Allergy New Zealand](#)
- [Allergic contact dermatitis](#) - emedicine dermatology, the online textbook
- [Shoe allergies](#) a personal resource for those allergic to their shoes

Books:

See the [DermNet NZ bookstore](#)

Author: Vanessa Ngan, staff writer

DermNet does not provide an on-line consultation service.
If you have any concerns with your skin or its treatment, see a [dermatologist](#) for advice.

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