iTanks Live hosted by CIKC

Chromium-6 compounds under thermal insulation

Thursday 6 november 2025

iTanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Program

12:30 pm	Walk-in
01:00 pm	Welcome speech
	Keynote Romy de Laat, R&D Lab Technician bij SEEF
	Keynote Ferdy de Smet, Founder van SEEF
	Keynote Dr. Yvonne Waterman, Waterman Legal Consultancy
02:15 pm	Break
02:30 pm	Pitches by Insulcon, Kavarmat, OOI, Ecopoint, Sherwin Williams, Econtras
02:55 pm	Panel discussion
03:55 pm	**Breakout session**
04:35 pm	**Closing and Wrap-up**
05:00 pm	Drinks
06:00 pm	Expected end of event

Chromium-6 compounds under thermal insulation

Keynote

Romy de Laat, R&D Lab Technician bij SEEF

Tanks
Innovation by Collectivity

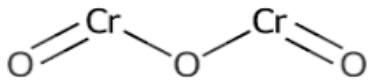
Chroom 6 Informatie Kennis Centrum

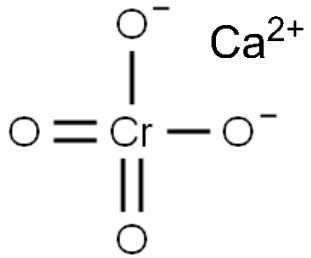
Formation of Cr (VI) Compounds beneath thermal insulation materials in industrial matrices

CIKC event – November 2025

Short chemistry lesson

- Oxidation and reduction of chromium-6
- What makes chromium-6 so harmful?
- Different forms of chromium-6





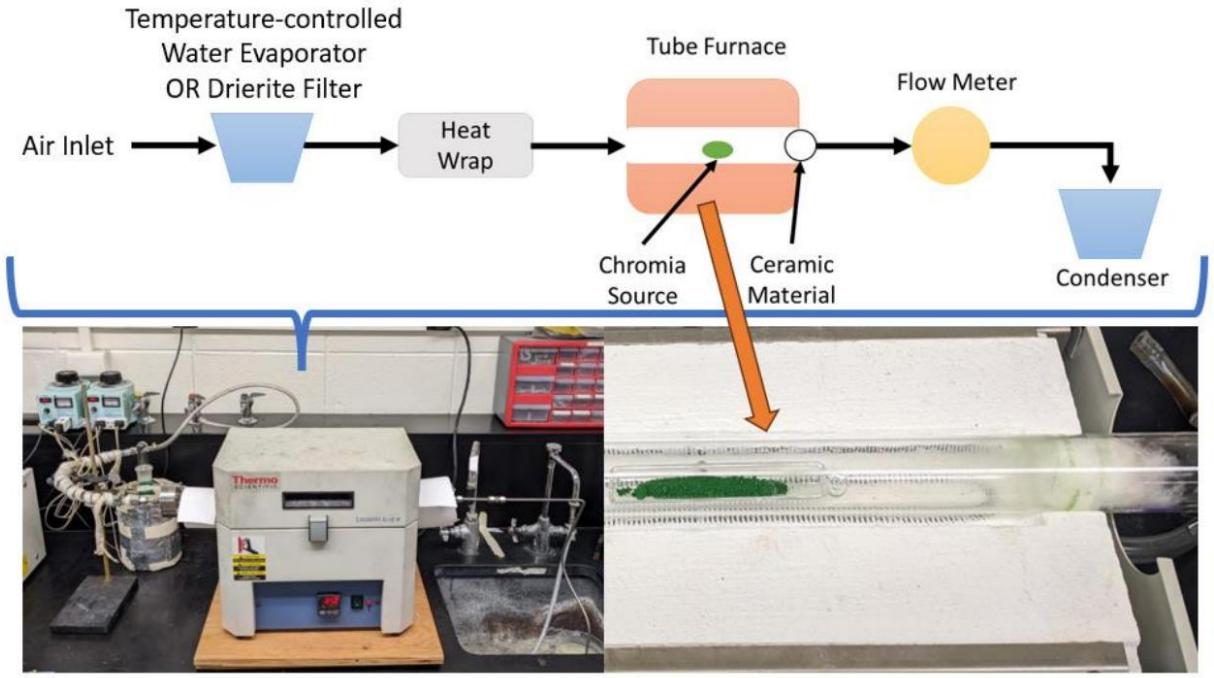
Cr(VI) ions	Cr(VI) salts (e.g., CaCrO4)
Molecular charge: 2-	Molecular charge: 0
Chromium in compound with oxygen	Cr(VI) ion in compound with an (alkali or alkaline earth) metal
Dissolved in liquid	Dry Solid
Unstable at room temperature	Stable at room temperature

INTRODUCTION: Study by Van Leeuwen – May 2024

- Background: Cr evaporation from alloys is well known, but its reaction with insulation materials has been little studied
- Research questions

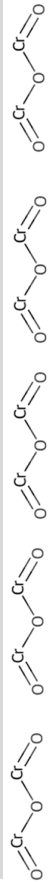
1. How does water vapor affect the amount and form of condensed Cr(VI)?
2. What is the effect of alkaline oxides in insulation materials on Cr(VI) condensation?

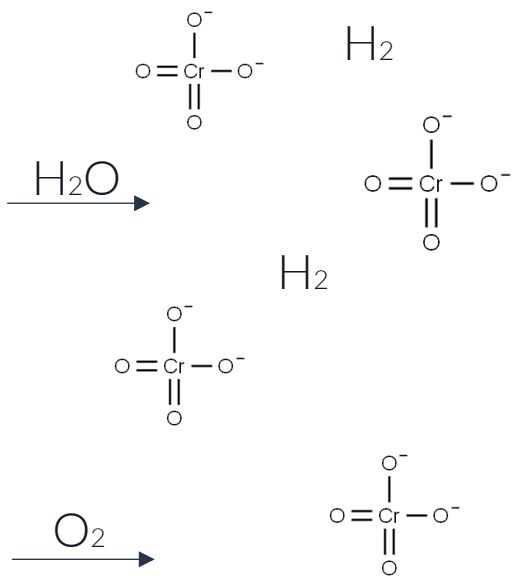
- Method: Controlled simulation of this process in tube furnaces at 850°C
- What does this study mean for SEEF?



How are Cr(VI) compounds formed?

Cr-containing alloy





CaO

Na2O

Isulation
(alkali or alkaline earth metals)

$H_2O + CaCrO_4$

$H_2O + Na_2CrO_4$

+250°C

Bron: Condensation of Chromium Vapor, Generated in High-Temperature (>800℃) Environments and Interactions with Aluminosilicate Surfaces by Travis Kent van Leeuwen

How do Cr(VI) compounds form?

Figure 25: Fibers post-exposure for humid conditions, clockwise starting from top-left: quartz wool, alumina wool, insulation #1, and insulation #2.

Results and conclusions from the study by ‘van Leeuwen’

Temperature	What happens?
100-230°C	Formation of a protective chromium(III) layer
From 250°C	Formation of chromium(VI) vapors
From 500°C	Onset of active chromium(VI) evaporation
Up to 850°C	Maximum tested temperature

- 0% H_2O: <0,1 ppm
- 3% H_2O: 0,40 ppm (standard humidity)
- 10% H_2O: 2,52 ppm

Results and conclusions from the study by ‘van Leeuwen’

- No alkali or alkaline earth metals = no stable Cr(VI) compounds (trace levels)
- Moisture cycle
- Cr(VI) ion vs Cr(VI) salt
- A solution is necessary to prevent exposure!

Chromium-6 compounds under thermal insulation

Keynote

Ferdy de Smet, Founder van SEEF

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Keynote: Technological innovations

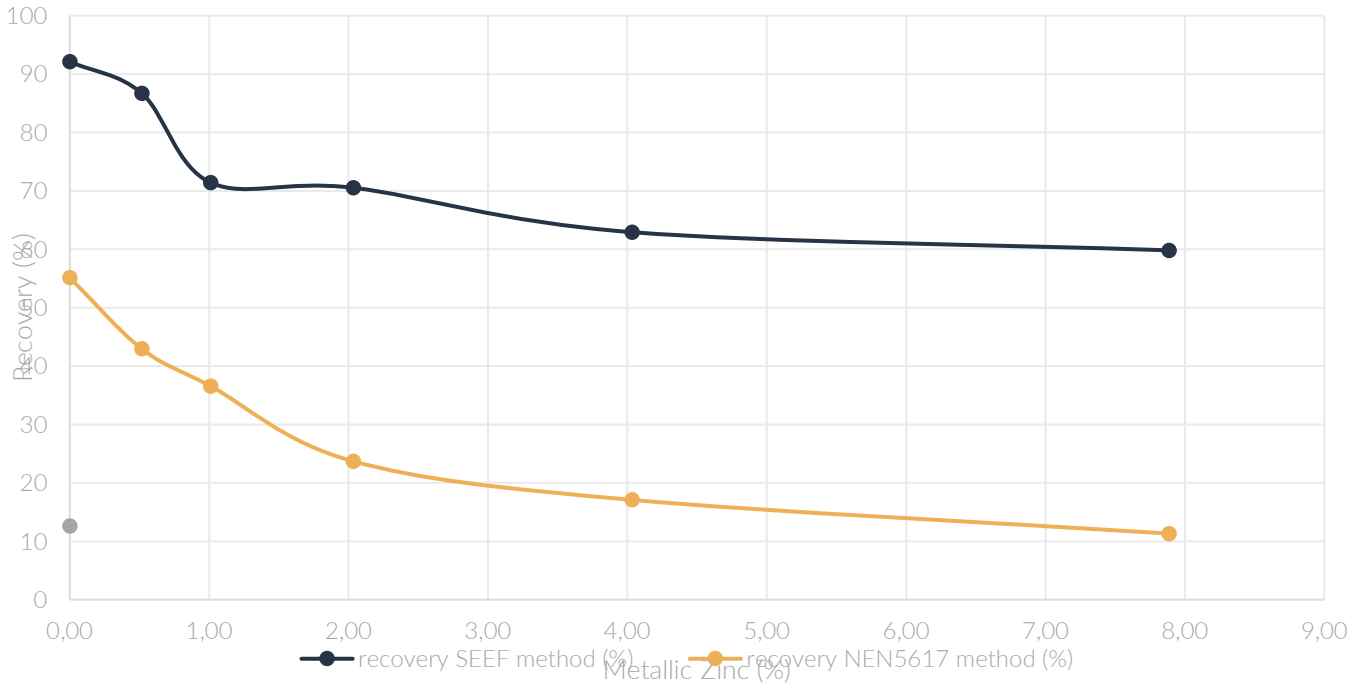
"From detection to control"

INTRODUCTION: “From theory to practice”

- From formation to approach
- What do we see in practice
- No data, no policy
- STOP strategy and obligations
- Accurate measurement
- Sector-wide regime, stronger together!

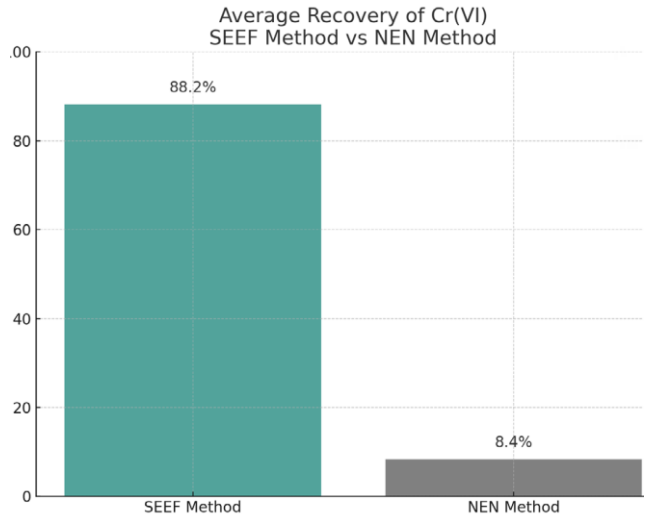
From formation to approach

- SEEF Established in 2019 -> Full Focus on Cr(VI) compounds
- In 2022, a breakthrough in Cr(VI) analysis techniques, followed by less than 2 years to 1,500 Cr(VI) analyses per month and 20 staff members.
- Independent knowledge and analysis agency based on truly reliable data



Where we encounter Cr(VI) compounds in pratice

- Under insulation: turbines, industrial installations, piping, automotive and transport.
  Without alkali and alkaline earth metals, no stable Cr(VI) compounds.
- Coatings: in 42% van de bestaande coatings
- In unexpected places, due to secondary contamination (airborne, transfer, etc.).
- Most common: $CaCrO_4$ → 1/150th of a sugar grain in the air = GW



The formation process

The formation of hexavalent chromium (Cr(VI)) is a chemical process that occurs when the following five elements are simultaneously present:

Chromium containing alloy
Materials such as stainless steel or low-alloy steel contain chromium that can convert into Cr(VI).

Temperatures from 250 °C
At this temperature and above, chromium compounds oxidize into the hexavalent form.

Alkali and alkaline earth metals
Elements like calcium (found in insulation materials) act as catalysts in the formation of Cr(VI).

Oxygen
Present in ambient air, oxygen facilitates the oxidation of chromium to Cr(VI).

Moisture
From ambient air promotes conversion of chromium compounds into soluble and toxic Cr(VI) compounds.

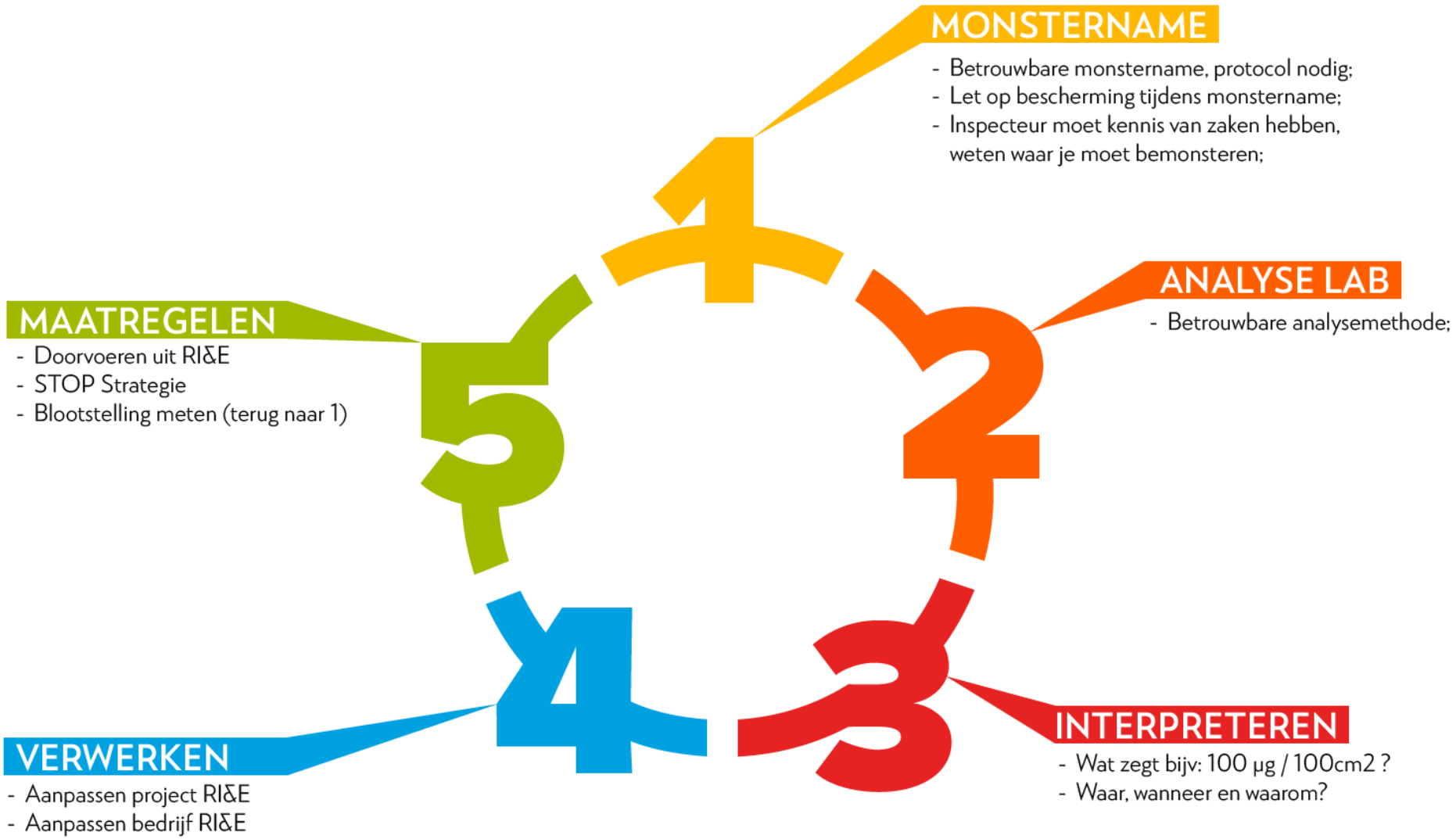
Where we encounter Cr(CI) compounds in practice

- Stainless steel perforated shielding, CHP manifold: **5500 µg Cr(VI)**
- Grate bar pellet combustion, after applying neutralizer: **2200 µg/100 cm²**
- Limit value in the Netherlands: **1 µg/m³ TGG-8-hour**
- The biggest challenge is that it can directly become airborne
- Additionally, there is also dermal absorption due to the solubility of Cr(VI) compounds

No data, no policy

- Measurements are not traceable or are not shared
- Data must be reliable; measuring Cr(VI) compounds can only be done by experts
- SEEF contributes by collecting reliable data and providing input
- CIKC is the platform for centralizing and structuring

Data as the starting point for control



STOP-strategy as a basis

- **SUBSTITUTION**

  The law requires substitution whenever possible; use alternative materials or techniques that prevent the formation of Cr(VI) compounds. Neutralization alone is not sufficient but serves as a tool to reduce exposure

- **TECHNICAL MEASURES**

  Shielding (insulating) processes, ventilation, dust control

- **ORGANIZATIONAL MEASURES**

  Clean work practices, designated zones, exposure registration

- **PERSONAL PROTECTIVE EQUIPMENT**

  The last line of defense, not the first reflex! Necessary for controlling inhalation and dermal exposure

What the law requires from us

- Cr(VI) = CMR substance → Exposure registration with a 40-year retention requirement
- Include in the RI&E (both company and project level)
- Measuring exposure is mandatory when Cr(VI) is present or suspected
- Annual training/information for employees on risks and working methods
- Enforcement of this by the Netherlands Labour Inspectorate

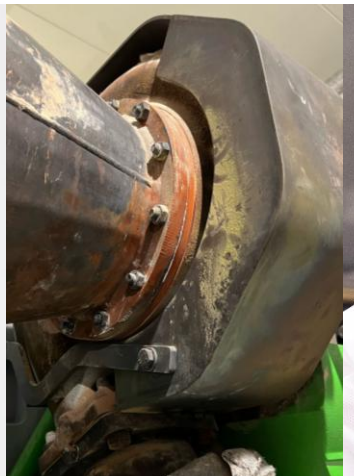
Building a Cr(VI) control regime together

- The current ‘Control Regime for Cr(VI) and Other Hazardous Substances 2.0’ is not applicable
- Use collected data to formulate sector-specific control measures
- Join CIKC and share your data!
- Within 2–3 years, a data-driven system will enable your organization to formulate and substantiate project-specific control measures

Accurate measurement is key to succes

- Wipe samples → CIKC protocol *(based on ASTM D6966-18)*
- Air samples → CIKC protocol *(assessment based on NEN689)*
- Material samples → CIKC protocol
- Use only techniques specifically developed for this matrix, taking into account the reduction of Cr(VI) → Cr(III) during analysis

  *“*Every measurement performed according to the same standard is a step towards better understanding.’’

Call for collaboration

We know how it forms, where it occurs, and what we need to do!

Only by measuring accurately, sharing data, and collaborating on solutions to prevent the problem in the future can we keep exposure to Cr(VI) compounds under control.

“Ssubstitution of Cr(VI) compounds begins with insight. And insight begins with reliable data: that is where our shared responsibility starts.”


SEEF

Chromium-6 compounds under thermal insulation

Keynote

Dr. Yvonne Waterman, Waterman Legal Consultancy

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Keynote Speech: chromium-6 and liability

Mr.dr. Yvonne Waterman FFAAM

Waterman Legal Consultancy
Global Asbestos Forum

Specialist in asbestos and occupational disease law

Waterman Legal Consultancy

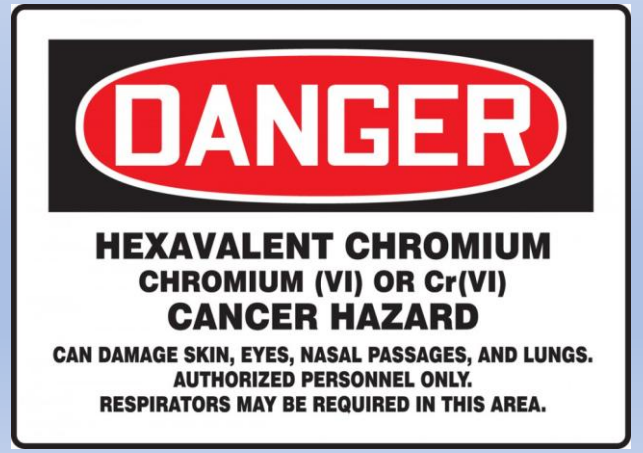
- Employer liability
- Asbestos issues of all kinds and sizes
- Since 2018… Chromium-6

Global Asbestos Forum

- Sharing global knowledge on asbestos
- Specifically aimed at professionals
- 8th World Congress: 13 & 14 November 2025 in Bergen, Norway

Wat topics will be covered?

1. What is Chromium-6?
2. Properties
3. Health aspects
4. Damage claims
5. Laws and regulations
6. The link with asbestos



What is Chromium-6

- Mineral Cr24
- Mining in South Africa, Kazakhstan, India, and Turkey.
- Why ‘6’? Chromium(VI) contains six negatively charged particles (electrons), which provides strong atomic-level adhesion
- Always bonded to something else, for example negatively charged chromate or dichromate
- Excellent adhesive and anti-rust agent
- Widely applicable: tens of thousands of uses
- Carcinogenic and genotoxic
- Tasteless, odorless
- Limit value: 1 microgram (µg)/m^3 = 0,001 milligram/m^3

Where can I find chromium-6?

- **Anti-corrosion:** Rust-resistant coatings on ship hulls, bridges, pipes, vehicles, metal stairs, etc.
- **Pigments:** Paint (including painted objects such as buildings), paint primers, coatings, ink, varnish, yellow/orange road markings, etc.
- **Electroplating:** Chromed and galvanized objects
- **Preservatives:** Leather and wood (leather products, fence posts, garden fences, etc.)
- **Metalworking:** Heat can convert natural chromium(III) into carcinogenic chromium(VI). Think of factory setups, oil rigs, machine rooms, casting, welding, cutting stainless steel, etc.
- Some cement products

Waterman Legal Consultancy

Some applications I

Waterman Legal Consultancy

Some applications II

Waterman Legal Consultancy

Some applications III

Waterman Legal Consultancy

Is ‘chromium-6’ something new?

- 1797: Discovery of a new metal
- 1972: Publications by the IARC Working Groups, followed by IARC Monographs
- 1987: Dutch Ministry of Defence aware of personnel exposure
- 1994: Ban on chromium(VI) in paint, cosmetics, and toys
- 1995: (approx.) Use of chromium(VI) by NS (Dutch Railways)
- 1996: Anderson et al. v. Pacific Gas and Electric
- 2000: Film adaptation of *Erin Brockovich*
- 2005: Tilburg aware of chromium(VI) hazard in train workshops, possibly earlier
- 2006: EU ban on chromium(VI) in new vehicles and electronics
- 2016: Investigation into Tilburg’s ‘toxic paint’
- 2016: Dutch Labor Inspectorate (SZW) starts providing information about chromium(VI)

Waterman Legal Consultancy

Scientific publications since the ‘70

- IARC: International Agency for Research on Cancer
- SCOEL: Scientific Committee on Occupational Exposure Limits
- NIOSH: US National Institute for Occupational Health
- EPA:US Environmental Protection Agency
- ILO: International Labour Organization
- WHO: World Health Organization
- European Committee for Risk Assessment
- ECHA: European Chemicals Agency
- AGS: Ausschuss für Gefahrstoffe
- Medical journals

- TNO: Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek.
- RIVM: Rijksinstituut voor Volksgezondheid en Milieu
- GR: Gezondheidsraad

Conclusion: From a legal perspective, chromium(VI) is not a ‘new’ risk. It is a neglected, even ignored, health hazard. This does not diminish the scope of the legal duty of care of the manufacturer and employer; if anything, it reinforces it.

Waterman Legal Consultancy

Why have we only started to take Chromium-6 seriously in recent years?

- Complacency? Showing off? Company culture?
- Deliberately looking away?
- Underestimating the seriousness?
- Insufficient occupational health knowledge in the workplace?
- Media hype?
- Economic considerations?
- Political influences?

Consider similar issues: lead in gasoline, tobacco, asbestos… Here too, it took decades before action was taken.
Why was that?

Waterman Legal Consultancy

Health aspects

monographs.iarc.fr

1 van 22

CHROMIUM (VI) COMPOUNDS

Chromium (VI) compounds were considered by previous IARC Working Groups in 1972, 1979, 1982, 1987, and 1989 (IARC, 1973, 1979, 1980, 1982, 1987, 1990). Since that time, new data have become available, these have been incorporated in the *Monograph*, and taken into consideration in the present evaluation.

1. Exposure Data

1.1 Identification of the agents

Synonyms, trade names, and molecular formulae for selected chromium (VI) compounds are presented in Table 1.1. This list is not exhaustive, nor does it necessarily reflect the commercial importance of the various chromium-containing substances. Rather, it is indicative of the range of

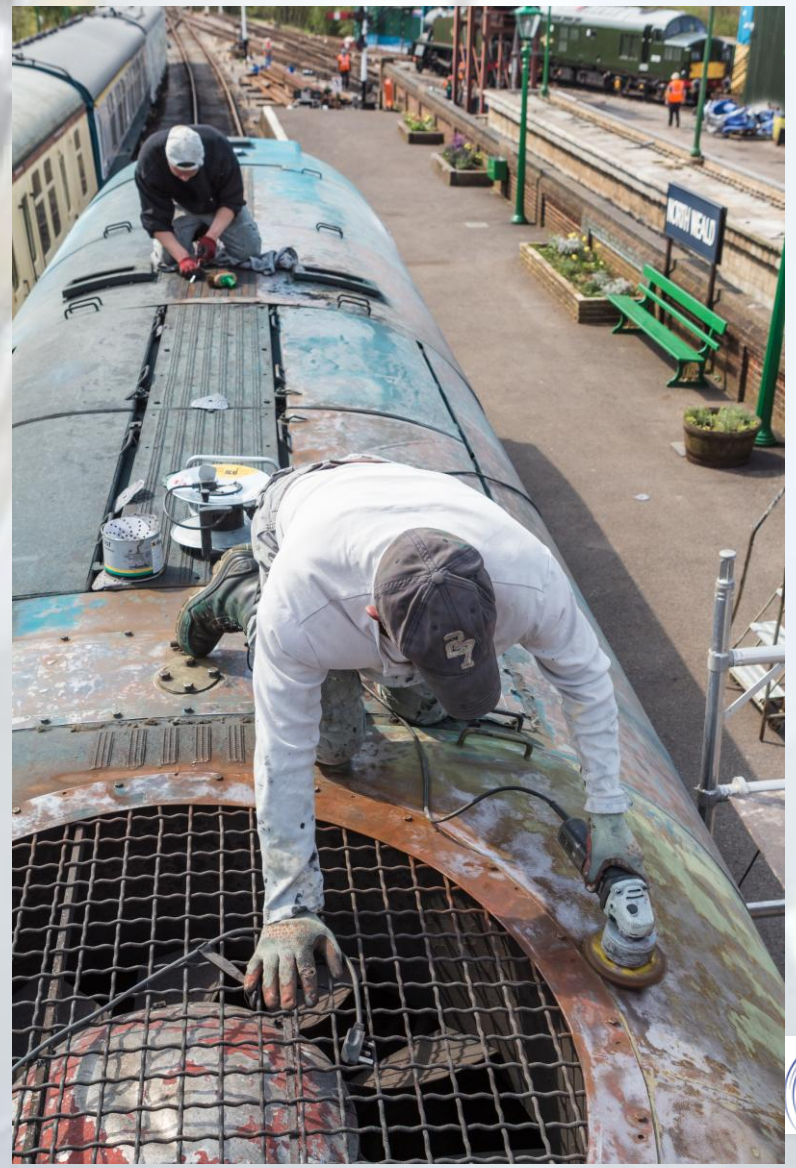
Chromium (VI) compounds are customarily classed as soluble or insoluble in water. Examples of water-soluble chromium (VI) compounds are sodium chromate (873 g/L at 30 °C) and potassium chromate (629 g/L at 20 °C). Water-insoluble chromium (VI) compounds include barium chromate (2.6 mg/L at 20 °C), and lead chromate (0.17 mg/L at 20 °C) (Lide, 2008). Compounds with solubilities in the middle of this range are not easily classified, and tech-

Waterman Legal Consultancy

Which activities lead to exposure?

Think of sanding, grinding, sawing, or heating/welding the (painted) material.
Also: sweeping the floor, tapping off dust, etc.

Chromium(VI) is highly carcinogenic! Even minimal exposure can be harmful.



Waterman Legal Consultancy

What type of exposure is harmful

- Inhalation
- Skin contact
- Spread
- Consumption (ingestion)

Typical: relation to moisture (lung fluid, saliva, stomach acid, sweat, etc.)

Waterman Legal Consultancy

What kind of symptoms?

Acute

- Sore throat and neck
- Runny nose, nosebleed
- Shortness of breath, wheezing
- Abdominal pain, nausea
- Poor vision
- Fluid retention (edema)
- Inflammation, ulcers, rashes
- Diarrhea

Long-term

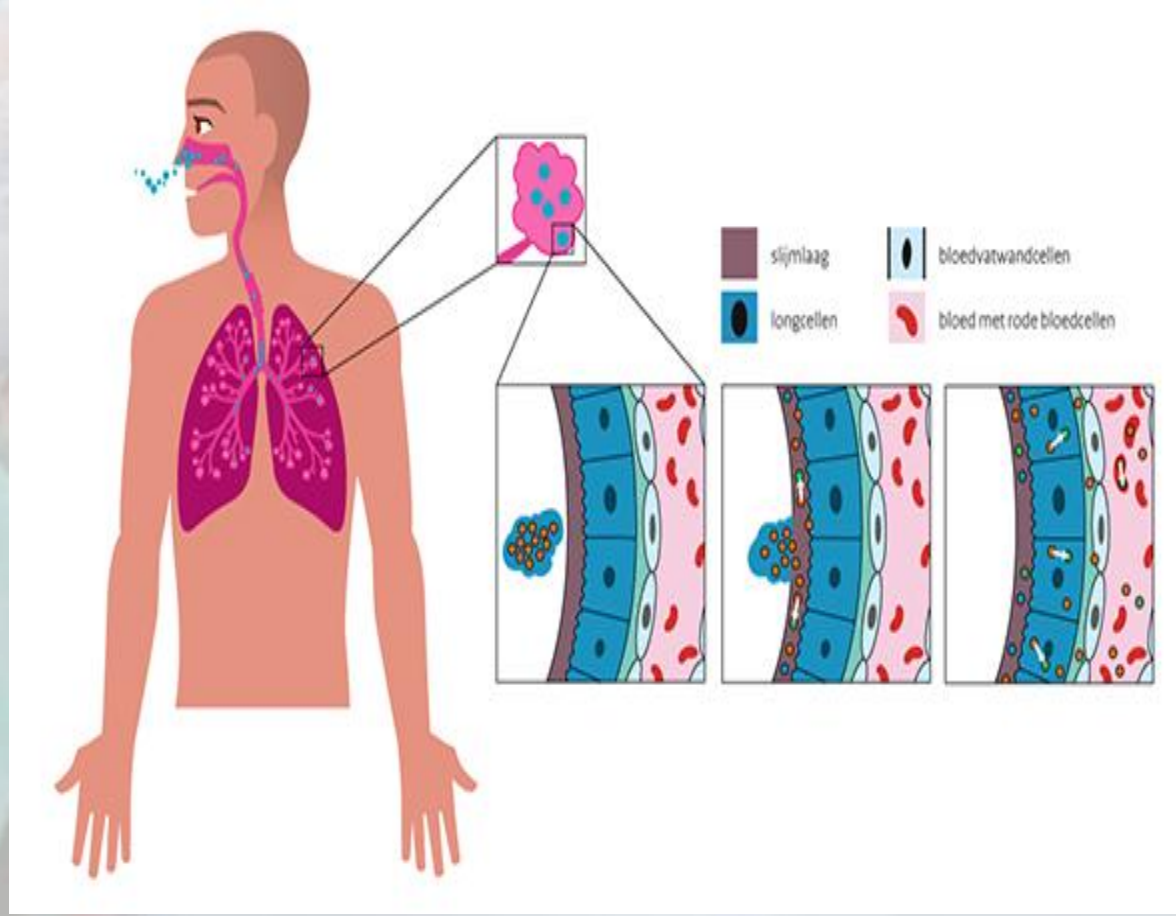
- Asthmatic complaints
- Skin problems
- Nasal complaints
- (Lung) cancer(s)
- Stomach and intestinal issue (ulcers, cancer)
- Kidney problems
- Genetic changes

Many of these health complaints have a long latency period: they take a long time to develop (risk of statute of limitations!). Additionally, they are often multi-causal.

Waterman Legal Consultancy

What happens in the body

1. Through physical contact, chromium(VI) is absorbed or inhaled into the body. Exposure only needs to be very minimal
2. Contact with moisture leads to gradual conversion into chromium(III). This can be toxic in high doses, but certainly not as harmful as chromium(VI)
3. Not all of it converts to chromium(III), and not immediately…
4. DNA damage is possible → cancer.



Waterman Legal Consultancy

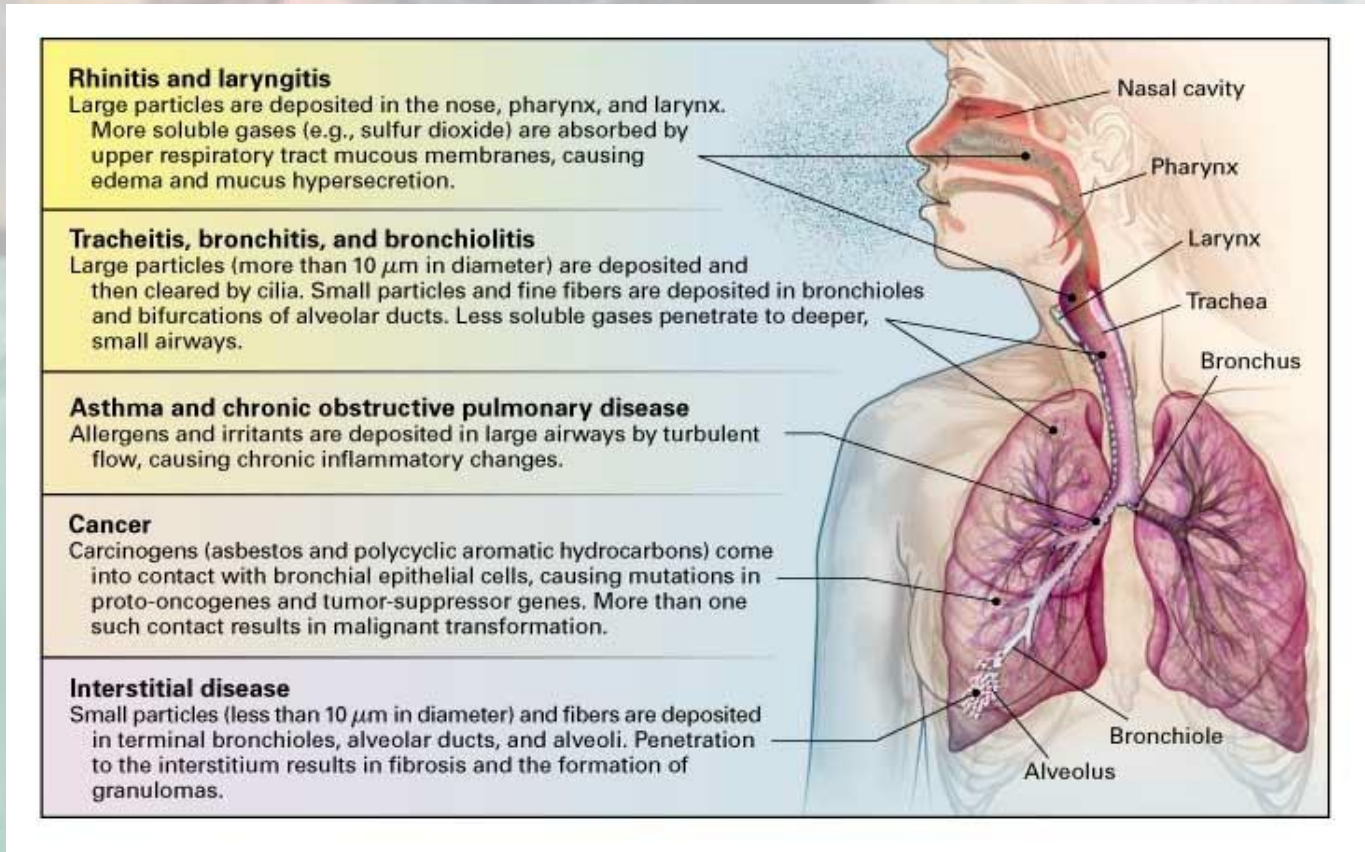
Which occupational diseases? I

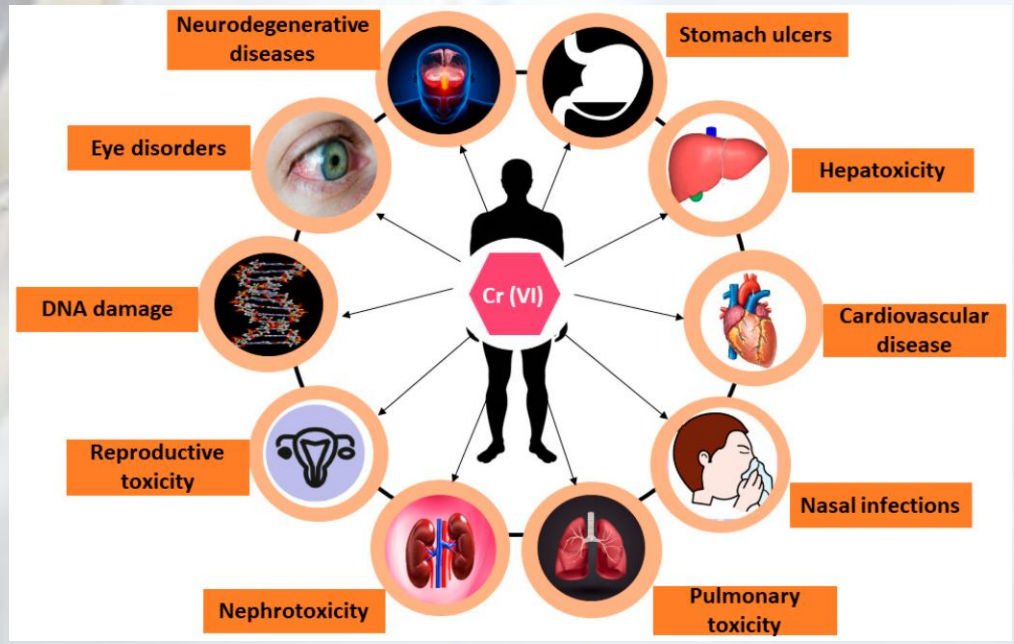
Probable; according to RIVM	Not probable according to RIVM (i.e., insufficient research)
• Lung cancer • Nasal and paranasal sinus cancer • Chromium(VI)-related allergic contact eczema • Chromium(VI)-related allergic asthma and allergic rhinitis • Chronic lung diseases (COPD, pulmonary fibrosis, interstitial lung diseases) • Perforation of the nasal septum due to chromium ulcers • Allergy	• Stomach and intestinal cancer • Throat cancer • Immune system disorders • Kidney disorders • Liver disorders • Cardiovascular complaints • Central nervous system complaints • Dental problems • Skin problems • Reduced fertility

Many of these occupational diseases are multi-causal in nature. This creates a very heavy burden of proof for the employee.

Waterman Legal Consultancy

Which occupational diseases? II





Waterman Legal Consultancy

Prevention is better than cure

- Awareness of the risk
- Frequent training (reinforcement)
- Measuring is knowing: XRF, SEM
- Personal protective equipment: Article 7:658 of the Dutch Civil Code requires everything that can reasonably be expected from the employer. Think of PPE, respiratory protection.
- Dry working conditions

Waterman Legal Consultancy

Damage claims

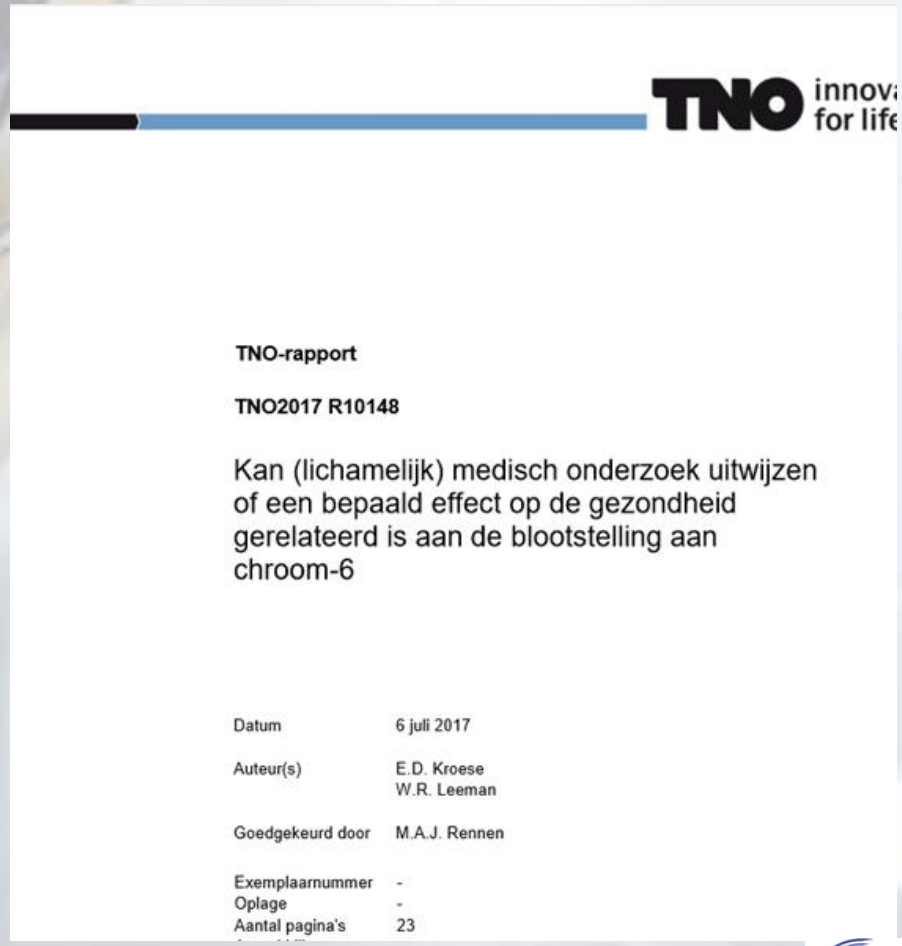
This is problematic in relation to legal claims:

- There are many possible disease outcomes from chromium(VI) exposure.
- Many of these disease outcomes can have multiple potential causes (multi-causal). The more multi-causal, the more difficult it becomes legally for the employee.
- Other (synergistic) factors may also play a role: tobacco, alcohol, diet, poor genetics (‘runs in the family’), peak exposures, exposure duration, etc.
- Establishing a causal link is very difficult, partly due to latency periods.
- The science regarding chromium(VI)-related diseases is still in its infancy.
- However, if a judge believes there is a reasonable chance that the employee was actually exposed to chromium(VI), the burden of proof can be reversed.

Waterman Legal Consultancy

What does the RIVM say about chromium-6?

"Can medical research prove whether chromium(VI) is the (sole) cause of a disease? [...] For all the diseases mentioned above, however, medical research cannot conclusively prove that exposure to chromium(VI) is the (sole) cause. [...] Whether workplace exposure is the (sole) cause cannot, however, be determined with certainty through medical research." P. 2



TNO innova for life

TNO-rapport

TNO2017 R10148

Kan (lichamelijk) medisch onderzoek uitwijzen of een bepaald effect op de gezondheid gerelateerd is aan de blootstelling aan chroom-6

Datum	6 juli 2017
Auteur(s)	E.D. Kroese W.R. Leeman
Goedgekeurd door	M.A.J. Rennen
Exemplaarnummer	-
Oplage	-
Aantal pagina's	23

Waterman Legal Consultancy

Causal relantionship

Arrest (Ruling) Ritsma/Lansink (Kidney pelvis cancer) HR June 7, 2013

- Expert: 17% increased chance that health complaints are work-related.
- Judges: that is too little (not sufficiently clear, measurable, and relevant) to assume a causal relationship.

Arrest (ruling) Van de Wege/SVB (RSI) HR june 7, 2013

- Expert: 75%(!) chance that health complaints are work-related.
- SVB lawyer: a range of alternative causes is conceivable (note: he proves nothing himself).
- Judges: the causal link is not sufficiently clear and demonstrably proven.

Waterman Legal Consultancy

What does this mean for the manufacturer and employer?

1. Clear and measurable, to a relevant degree' is an almost impossible burden of proof for the employee, especially regarding chromium(VI).
2. Note: the employee must also pay for a very lengthy and costly procedure. Average cost of a single medical expert report: approximately €8,000.
3. The employer will only be held liable by the court in rare, exceptionally clear cases.

An idea: add chromium(VI)-related diseases to the official List of Occupational Diseases (the TSB scheme) through the Institute for Victims of Occupational Diseases caused by Hazardous Substances (ISBG)?

Waterman Legal Consultancy

Laws and regulations I

Article 7:658 of the Dutch Civil Code: employer liability. The employer must do everything that can reasonably be expected of them.

Rely on general occupational health and environmental safety principles for toxic substances:

- Occupational health legislation: think of Risk Inventory & Evaluation (RI&E), workplace design, PPE, training, etc.
- Major Accidents Risks Decree (BRZO 2015), including accident scenarios
- Supplementary RI&E (ARIE, Working Conditions Decree), including damage limitation
- Occupational hygiene strategy: minimize risks, control at the source
- REACH: EU legislation on the production and trade of chemical substances, including lists of chemicals, limit values, etc.

Waterman Legal Consultancy

Laws and regulations II

- **The occupational hygiene strategy:** minimize risks, control at the source.
- Source measures
- Collective measures – for example, containment
- Individual measures – for example, minimizing exposure per person
- Personal protective equipment – last resort, for example, Tyvek suit or biohazard suit, face mask, powered air respirator, etc.

Waterman Legal Consultancy

Proactively prevent and limit damage claims as an employer

- *Look for substitute materials* instead of chromium(VI). In essence: think ahead (*demonstrably!*). Prevention is better than cure. Work safely.
- Build a general occupational health file with an occupational hygienist. Why? This can significantly reduce potential fines from the Dutch Labor Inspectorate (ISZW). It pays for itself, also in terms of increased awareness and safety.
- Regularly conduct toolbox meetings, etc., and record attendance. Provide regular instructions, supervision, and warnings. Build the file.
- Record incidents (individual occupational health file).

Waterman Legal Consultancy

Being proactive as a sector

- What is the *state-of-the-art* knowledge in this field? Seek information from global experts, for example BOHS, ILO, IARC, ICOH.
- Consider a mutual fund for legal costs and compensation.
- Consider including the most common diseases on the official List of Occupational Diseases.

Waterman Legal Consultancy

Thank you for your attention!

Contact

mr.dr. Yvonne Waterman FFAAM
Waterman Legal Consultancy
waterman@watermanlegal.nl
06-819.189.43
Search me on LinkedIn!

Waterman Legal Consultancy

Chromium-6 compounds under thermal insulation

Pitches

- **Insulcon**
- Kavarmat
- OOI
- Ecopoint
- Sherwin Williams
- Econtras

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Who are we?

Insulcon Group:
“Leader in High Temperature Solutions”

Role in the chain:
Advisor, distributor, and converter of high-quality thermal insulation materials.
Focus on safety, sustainability, and regulatory compliance.
No commercial promotion, but technical and content-related involvement.

“Insulcon is a knowledge-driven partner that works daily on safe thermal systems in the heavy industry”

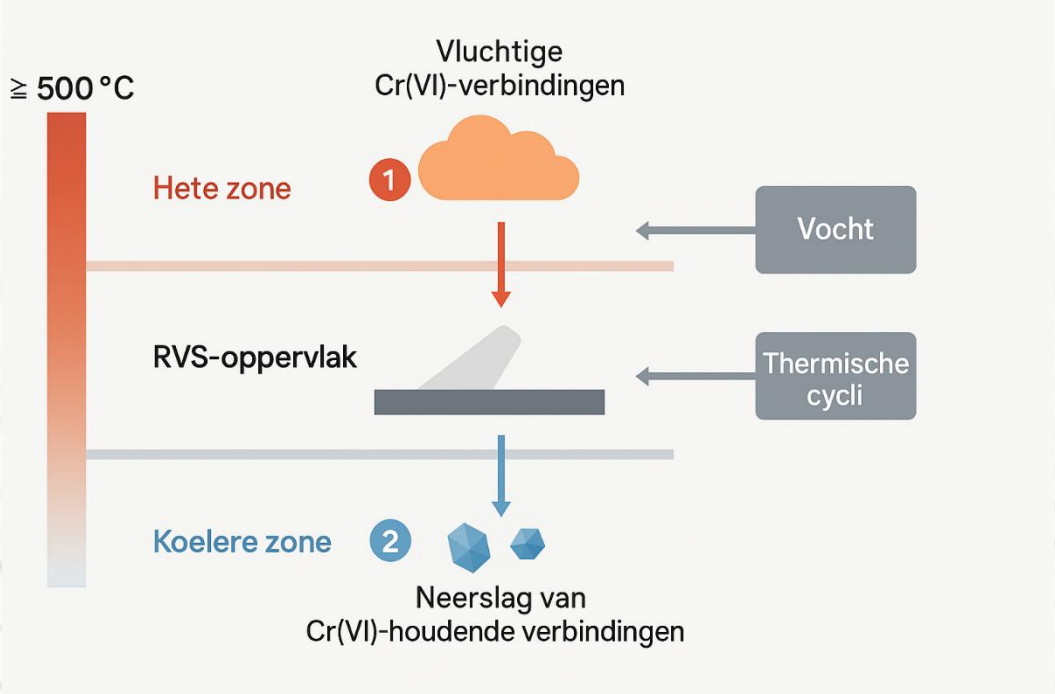
Why do we participate

Cr(VI) under insulation is a real HSE risk during maintenance of stainless steel systems!

We want to help clarify the picture and provide technical clarity.

We follow the ECFIA approach but continuously validate it against the latest scientific knowledge.

Our participation reflects our role as a knowledge-driven partner: the bridge between practice and theory for a factual and shared risk perspective.



How do we approach this?

“Our contribution is focused on insight, control, and collaboration.”

Insight: analyzing practical data and linking it to scientific reports.

Control: focus on material selection, moisture control, and inspectability, not on source elimination.

Collaboration: sharing knowledge within the initiative (ECFIA approach) to develop realistic guidelines.

Goal: a safe, well-founded, and workable approach for all parties involved.

“We want to separate facts from assumptions and ensure that measures are taken based on reliable knowledge.”

Chromium-6 compounds under thermal insulation

Pitches

- Insulcon
- **Kavarmat**
- OOI
- Ecopoint
- Sherwin Williams
- Econtras

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Cleansulation Technology

Preventing Chromium(VI)

IT WAS NEVER SULFUR, IT WAS ALWAYS CALCIUM CHROMATE

BY MARKUS SOMMER

Because the heat hit the wrong elements

You don’t need a Nobel Prize in chemistry to understand which two elements make up this substance when it is called “calcium chromate” ($CaCrO_4$). This usually yellowish substance is carcinogenic, absorbable through the skin, and environmentally harmful. It forms thermochemically when calcium-containing insulation materials come into contact with chromium-alloyed hot components at high temperatures

(>350°C).

Partially reducing Chroom(VI)

Chromium(VI) cannot be neutralized, only reduced—and even under industrial conditions, this is never complete.

The reduction solution is a useful tool during remediation, but it does not constitute a substitution in terms of occupational protection. The source is a (alkali or alkaline earth-containing) thermal insulation material.

REPLACE the hazardous material, don’t just control it

The formation of carcinogenic substances in the workplace must be prevented at the source; hazardous substances or processes that lead to the formation of hazardous substances MUST be changed.

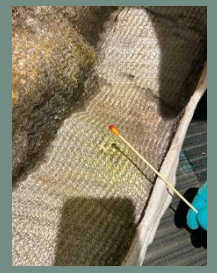
Incorrect removal; contaminated remediation

Before substitution can take place, the contaminated insulation parts must be dismantled, and chromium-contaminated components and areas must be thoroughly cleaned (remediated). These tasks, just like the later supply of the substitute, are part of the service offering of **Cleansulation® Technology**.

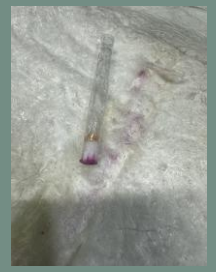
Alkaline oxides (CaO/Na2O) in insulation material – Formation of chromium(VI)

Mineral wool (18% Cao/Na2O)

Superwool (40-50% CaO)



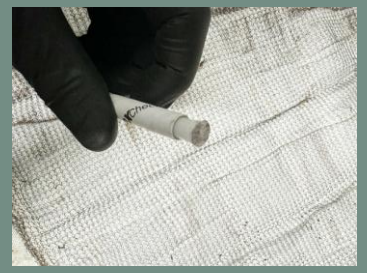
Glass fiber (15-20% CaO)



Fiber mats, including microporous (15-20% CaO)

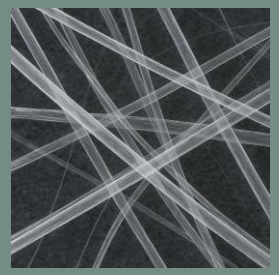
ECR-Glass fiber (30% CaO)

No alkaline oxides (CaO/Na2O) in the isulation materiaal – No formation of chromium(VI)

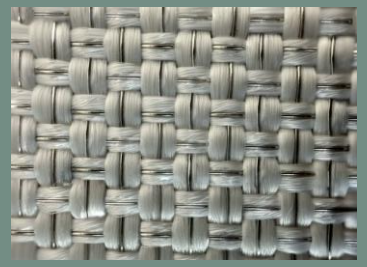


Cleansulation®System

VitroSilK® - The insulating fiber that prevents the formation of chromium(VI)



VitroSilK®Fibre



VitroSilK®Shield

VitroSilK®Flex

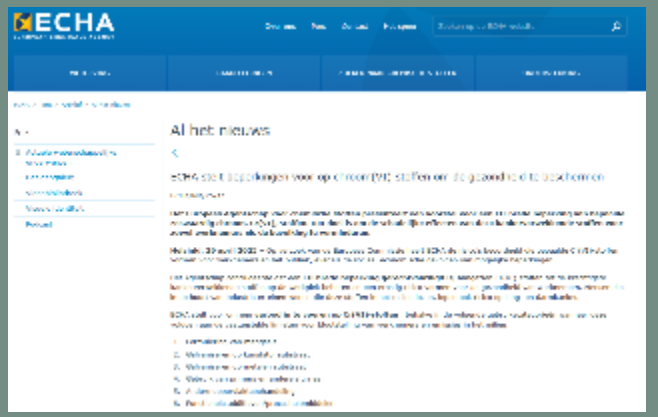
VitroSilK®Loft

VitroSilK®Protekto

- Silicate-like E-glass fiber
- Alkali oxide-free
- Temperature resistant up to >750 °C
- Non-irritating to skin, low dust
- Chromate blocker (single-sided or double-sided)

Proactive substitution today prevents illegal use tomorrow

Both the use of insulation systems that predictably lead to the formation of chromium(VI) compounds and their chemical reduction are considered 'use' under the **REACH** Regulation. This use will be prohibited once the EU-wide ban on use, scheduled by **ECHA** for 2027/2028, comes into effect.



THANK YOU FOR YOUR ATTENTION.

Cleansulation®Technology
Identify | Decontaminate | Replace

Cleansulation®Academy
Understanding Chromium(VI)

Cleansulation®System
Avoid Chromium(VI)

Cleansulation®Association
Distribution of VitroSilK®

Contact:

Cleansulation®Technology B.V.
Damsluisweg 52
1332 ED Almere
t: 036-5320303
e: info@sibisolatie.nl

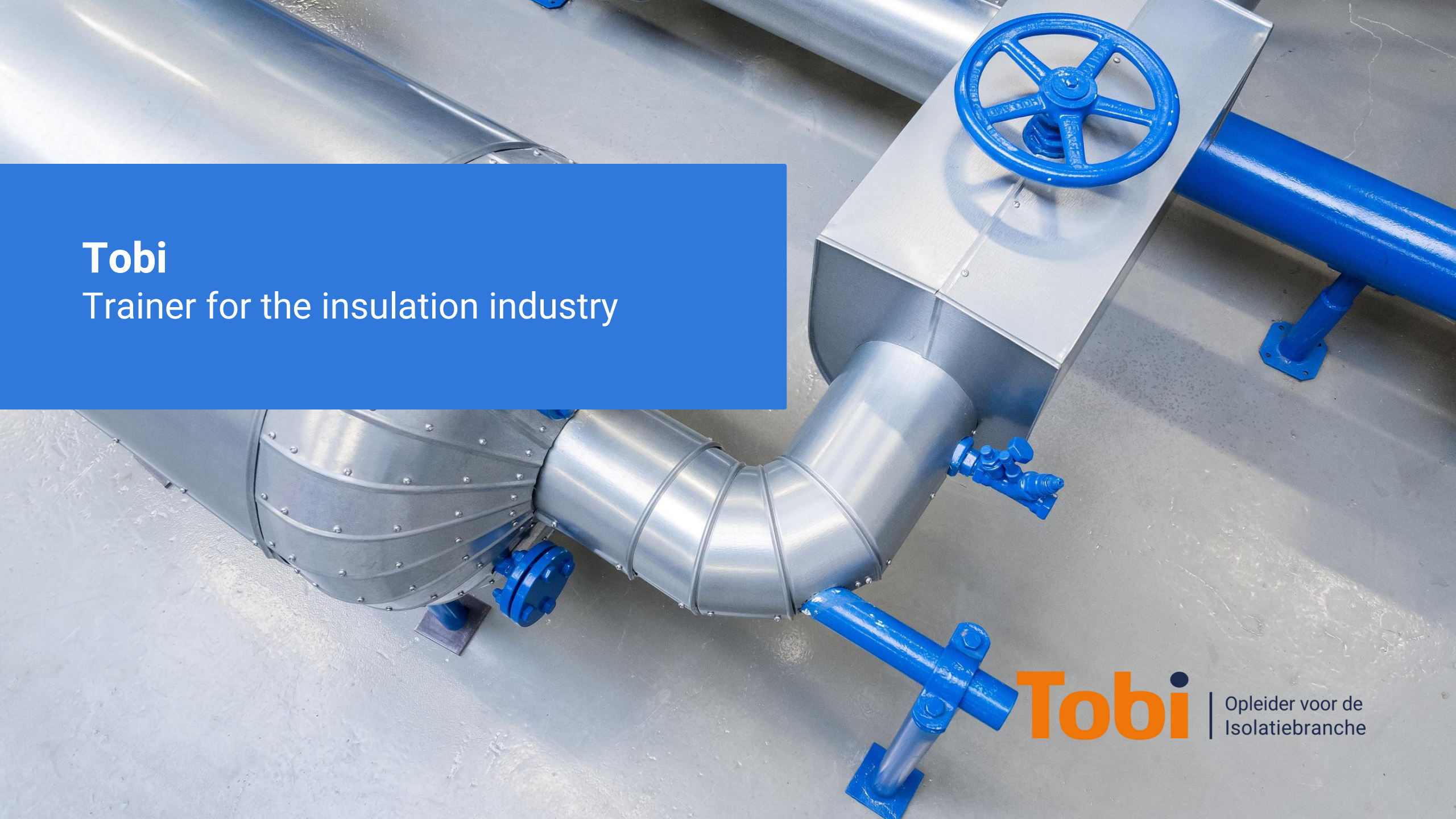
Chromium-6 compounds under thermal insulation

Pitches

- Insulcon
- Kavarmat
- **OOI**
- Ecopoint
- Sherwin Williams
- Econtras

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum



Tobi

Trainer for the insulation industry

Tobi | Opleider voor de Isolatiebranche

Tobi - partner in ontwikkeling

Specific learning need

Customized

Development needs

Organization & individual

Blended learning path

Online & classroom-based

HRD partner

Strategy and Technology

Tobi | Opleider voor de Isolatiebranche

Tobi – course offerings

Industrial Insulation Technician (IIT) (Dutch: IMI)
(IMI) IIT recertification

Industrial Insulation Technician – Allround (IIT-A) (IMI-A)

IIT-A (IMI- A) recertification

Insulation sheet metal basis

Insulation sheet metal advanced

Industrial measuring

Basic knowledge of ship insulation

Inspector course

Tobi | Opleider voor de Isolatiebranche

Tobi - Inspecteurscursus

Inspector:
Tasks and responsibilities
Attitude and behaviour

Project:
Planning, Inspection, Test plan
Inspection and verification
Reporting, documentation and non-conformity

Health risks

Corrosion theory
Corrosion under insulation
Risks factors removing insulation

Relevant standards for insulation work including NORSOK and the CINI guidelines

Reasons for insulation, different insulation classes, and fire-resistant penetrations

Tobi | Opleider voor de Isolatiebranche

Appointment?

Contact

085-7607688
info@tobi.nl
Pottenbakkersweg 9, 3449 HZ Woerden

Chromium-6 compounds under thermal insulation

Pitches

- Insulcon
- Kavarmat
- OOI
- **Ecopoint**
- Sherwin Williams
- Econtras

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Approach to Chromium-6 dust

- RVS/Inox verhitting, heating, optimal conditions:
  - Chromium in stainless steel
  - Temperature >250°C
  - Calcium-containing insulation (but also K, Na of Mg)
  - Moisture/condensation

- Often recognizable as yellow dust

- Typical in:
  - CHP: Combined Heat and Power
  - Insulation of (turbo) engines
  - Heated stainless steel (RVS/Inox) and condensation
  - More…?"

Chromium-6 Neutralizer

- Acid solution reduces CrVI to CrIII
- Ready-to-use
- Bottles with sprayer or drums with pump sprayer
- Shelf life at least 2 years
- Colorless – yellow – orange – red – brown – dark brown
- Certificate SEEF
  - Effective neutralization
  - 15 minutes of application or on cooled surfaces
  - Significantly reduces the risk of exposure to carcinogenic CrVI
  - A tool within the safety strategy

SEEF ECOPOINT

ECO-POINT CHROME-VI NEUTRALIZER (PR269)

ONDERZOEKSBASIS

In opdracht van Eco-Point International BV heeft SEEF B.V. in augustus 2025 een verdiepend onderzoek uitgevoerd naar de werking, opslag en toepassing van *Chrome-VI Neutralizer (PR269)*. De resultaten bevestigen dat het product effectief bijdraagt aan het beperken van het risico op blootstelling aan Cr(VI)-verbindingen, mits deze verbindingen oplosbaar zijn in de neutralizer-oplossing.

BELANGRIJKSTE BEVINDINGEN

- Effectiviteit: de neutralizer reduceert Cr(VI)-verbindingen effectief wanneer deze in oplosbare vorm aanwezig zijn zoals stof of een 'indringbaar' materiaal. De effectiviteit neemt af naarmate het product ouder wordt. Gebruik van jongere batches verdient de voorkeur.
- Behandeling voor een optimale werking wordt geadviseerd het te behandelen oppervlak gedurende minimaal 15 minuten nat te houden met de neutralizer, waarbij het oppervlak voldoende moet zijn afgekoeld conform de voorschriften van de machinefabrikant.
- Opslag & veroudering: het product is onderhevig aan langzame afbraak. Bij juiste opslag (donker, ongeopend en onder 25°C) blijft het tot circa twee jaar volledig werkzaam. Verlaurde vloeistof (geel/oranje/rood) is nog actief, maar bij sterk donkerbruine kleur wordt vervanging aangeraden.

METING EN CONTROLE

Voor en na behandeling kan een indicatieve test worden uitgevoerd met swabs (zoals de SEEF ST01). Een negatieve uitslag is echter **niet** betrouwbaar; in dat geval wordt geadviseerd een aanvullende betrouwbare analyse worden uitgevoerd zoals met de SEEF TK01 of een laboratoriumanalyse. Neem hiervoor contact op met SEEF.

Indien na behandeling nog een positieve testuitslag wordt gevonden, betekent dit dat de neutralisatie onvoldoende is geweest. Er dient dan een herhaalde behandeling plaats te vinden. In specifieke situaties kan specialistisch advies van Eco-Point of SEEF nodig zijn om te bepalen hoe de behandeling het beste kan worden voortgezet.

GEZONDHEID EN VEILIGHEID

- *Chrome-VI Neutralizer (PR269)* draagt bij aan het reduceren van blootstelling aan stof dat carcinogene Cr(VI)-verbindingen bevat. Het is echter geen garantie dat blootstelling volledig wordt voorkomen.
- Toepassing van de neutralizer moet altijd deel uitmaken van een bredere beheersing van risico's, inclusief beoordeling van de specifieke situatie, naleving van veiligheidsvoorschriften en, indien nodig, (blootstellings)metingen om de effectiviteit vast te stellen.
- Het product is een hulpmiddel binnen een veiligheidsstrategie en geen oplossing die alle risico's zelfstandig elimineert.

ADVIES

Raadpleeg altijd de product- en veiligheidsinformatiebladen en neem bij vragen contact op met de productadviseur van Eco-Point of met SEEF B.V. voor aanvullende ondersteuning.

SEEF
Tabweg 11
4851 SJ Ulvenhout
Nederland
Telefoon 085 047 0574
Email info@seef.nu

Eco-Point International
Canadaweg 28
4661 PZ Halsteren
Nederland
Telefoon 0164 65 25 55
Email info@eco-point.com

ECOPOINT
PART OF DST-CHEMICALS

In summary:

- Where chromium is heated, CrVI dust is formed
- Carcinogenic: measures are mandatory
  - STOP: **S**ubstitution, **T**echnical, **O**rganizational, **P**PE
- Proven active RTU (ready-to-use) solution
- Easy to apply
- Backed by SEEF certificate (4 languages)
- CHPs, engines (cars, ships, turbines) and more
- Do not expose yourself or employees to CrVI: use protection
- Measuring is knowing!

More information:

Eco-Point International BV

+31-164-632555

www.eco-point.com

ECOPOINT PART OF DST-CHEMICALS

Chromium-6 compounds under thermal insulation

Pitches

- Insulcon
- Kavarmat
- OOI
- Ecopoint
- **Sherwin Williams**
- Econtras

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

SHERWIN-WILLIAMS Protective & Marine

The formation of chromium VI on stainless steel under insulation is an undesirable reaction that occurs at high temperatures.

At SHERWIN WILLIAMS, we are aware of the chromium VI under insulation issue and are internally exploring possible solutions to prevent this problem. Of course, there are currently no ready-made solutions, but our R&D lab has initiated the search for them.

A coating barrier is being considered.

How it works:

- **Barrier function:** The primary way a paint coating works is by creating a physical barrier that isolates the stainless steel surface from the external environment, preventing contact with moisture (water/electrolyte) and corrosive ions (such as chlorides) that may be present in the insulation.

- **Prevention of Cr(VI) formation:** Chromium(VI) forms in warm and humid industrial environments when chromium from the passive layer of stainless steel oxidizes in the presence of alkaline earth metals (e.g., calcium oxide from some conventional insulation materials) at high temperatures (above approx. 300 °C). By creating a barrier, the coating prevents the necessary chemical reactions from occurring on the metal surface.

- **Mitigation of CUI/ECSCC:** Coatings are a standard part of a comprehensive strategy to prevent corrosion under insulation (CUI) and external chloride stress corrosion cracking (ECSCC).

SHERWIN-WILLIAMS Protective & Marine

Important considerations

- **Coating selection:** The coating system must be specifically selected for use on stainless steel and be suitable for the operating temperature and service environment (we believe that Heat-Flex 1200 Plus can provide a suitable barrier).
- **Surface preparation:** Proper surface preparation (such as abrasive blasting) is crucial to ensure good adhesion between the stainless steel and the coating, as the smooth surface of stainless steel can hinder adhesion.
- **Coating integrity:** The coating must be applied correctly and remain fully intact. Localized breakdown or damage to the coating can lead to more severe localized corrosion, as it creates a potential crevice where corrosive substances can concentrate.

Chromium-6 compounds under thermal insulation

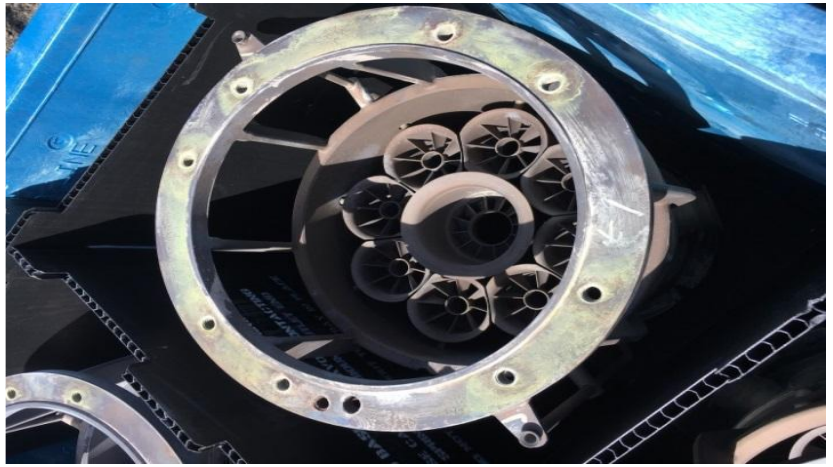
Pitches

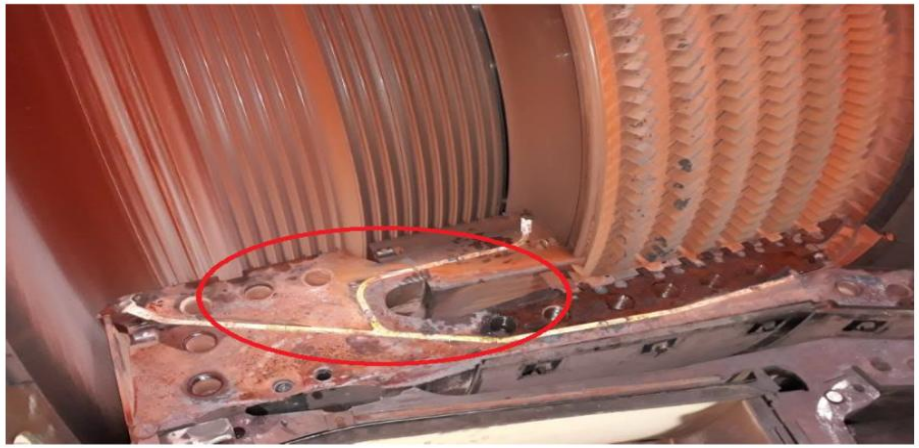
- Insulcon
- Kavarmat
- OOI
- Ecopoint
- Sherwin Williams
- **Econtras**

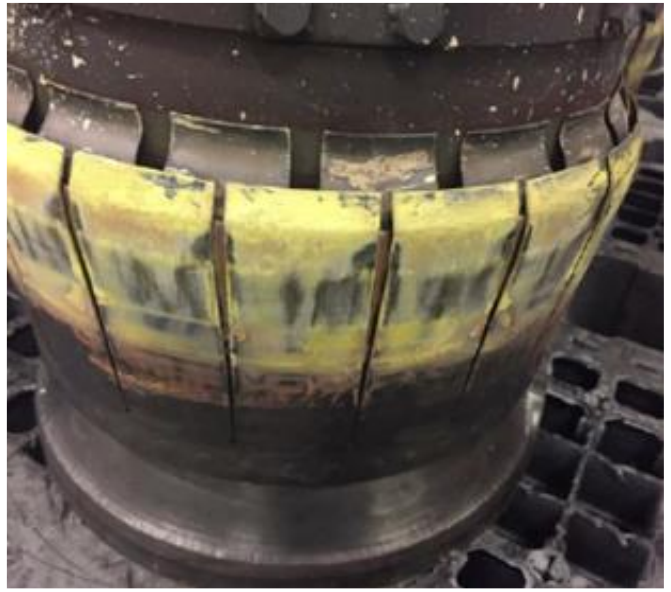
Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Recognizing Chromium (VI)





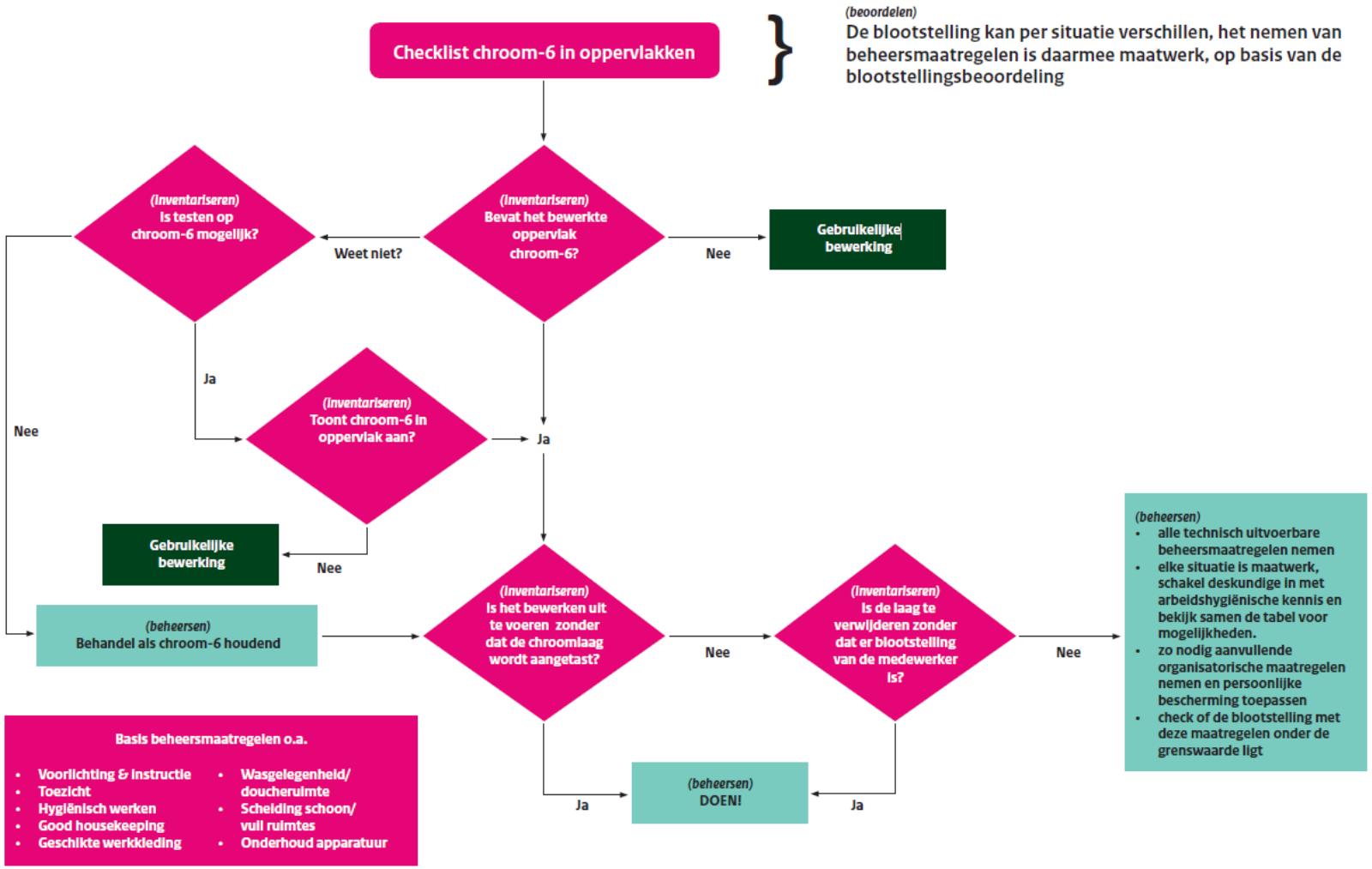


econtras® isolatie
MADE BY ISOLATIEBEDRIJF C.J. VAN WAAS BV

Cleaning with Ascorbic Acid 2

- Spray/moisten the surface with Siemens Umwandler spray or a (Vattenfall-prepared) ascorbic acid solution.
  The Siemens Umwandler spray and the homemade ascorbic acid solution have a limited shelf life. Therefore, clearly indicate the preparation/expiration date.
  The solution should remain in contact with the contamination long enough. This can be achieved with a sufficiently sticky solution or by keeping the contamination continuously wet.
- Allow to act for a few minutes.
- Wipe the surface with a cloth.
- Conduct another test. Negative result: no further measures required. Positive test: repeat the above steps.
- Note: Always finish cleaning with a test that gives a negative result. This applies to both cleaning methods.

econtras® isolatie
MADE BY ISOLATIEBEDRIJF C.J. VAN WAAS BV



Chromium-6 compounds under thermal insulation

Paneldiscussion

Hein Tersteeg (CIKC)
Ron Bömer (ArbeidsH)
Ferdy de Smet (SEEF)
Yvonne Waterman (Arbeidsrecht)
Jody Schinkel (TNO)

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Chromium-6 compounds under thermal insulation

Breakoutsession

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

Chromium-6 compounds under thermal insulation

Closure & Wrap-Up

Tanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum

iTanks Live hosted by CIKC

Chromium-6 compounds under thermal insulation

Thursday 6 november 2025

iTanks
Innovation by Collectivity

Chroom 6 Informatie Kennis Centrum