



## HEAVY METALS - TOTAL

**Other Names** See below for heavy metal substances that have total content limits in the AFIRM RSL

CAS Number	Substance
7440-38-2	Arsenic (As)
7440-43-9	Cadmium (Cd)
7439-92-1	Lead (Pb)
7439-97-6	Mercury (Hg)

**May Be Found In**

- Metal alloys and coatings
- Pigments and dyes
- PVC

**Heavy Metals are a loosely defined group of elements that have metallic properties including the ability to conduct heat and electricity. In most cases, classification of a heavy metal is based on molecular weight, atomic number, or related physical properties.**

### Uses in the Supply Chain

Heavy metals, including arsenic, cadmium, lead, and mercury may be found in pigments and dyes, metal alloys and coatings, and in the PVC stabilization process. Cadmium may be found in low quality dyes. Arsenic, cadmium, lead, and mercury may be found in pigments, but have largely been phased out. Metal alloys and coatings may contain arsenic, cadmium, and lead. PVC stabilization may be accomplished with the use of cadmium or lead.

### Why Heavy Metals are Restricted

- Legislation in major markets around the world restricts the presence of heavy metals in finished products.
- Heavy metals are associated with the following environmental and human toxicity characteristics:
  - Aquatic toxicity: arsenic, cadmium, lead, mercury
  - Carcinogenicity: arsenic, cadmium
  - Kidney, brain and/or reproductive toxicity: lead, mercury
  - High acute toxicity: arsenic, cadmium, mercury

### Sourcing Compliant Materials from Your Suppliers

- Contact your suppliers and explain that you require their manufactured materials to be compliant with the current AFIRM RSL limits.<sup>1</sup>
- Require suppliers to submit a confirmation of material compliance or a test report from a third-party laboratory.
- When materials are received, consider performing risk-based testing to ensure the current AFIRM RSL limits are met.
- Pay special attention to suppliers of metal trims and PVC materials.
  - Ensure metal alloys, weldings or surface coatings do not contain arsenic, cadmium, or lead.
  - Ensure cadmium and lead are not used for PVC stabilization.
- Metals may be released from metal-complex dyes if those dyes are not properly bound to the material.
- Share this sheet with your material suppliers and instruct them to work with their chemical suppliers to source heavy metal-compliant formulations using the guidance in the next section.



## Chemical Information Sheet

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### Sourcing Compliant Formulations from Your Chemical Suppliers

- For all formulations, request SDS documentation that meets current GHS requirements.
- Contact your suppliers and explain that you require formulations to be compliant with current ZDHC MRSL limits whenever applicable and that you require formulations with no intentionally-added heavy metals (As, Cd, Pb, Hg).<sup>2</sup>
- Discuss with your chemical supplier whether any safer alternatives are available that are suitable substitutes for your production needs.
- Prior to procuring any formulation, the chemical properties must be reviewed to ensure that proper protective equipment, chemical storage facilities, facility engineering controls, and associated treatment/disposal facilities are appropriate for the chemical(s).
- Pay particular attention to the following formulations:
  - Low quality pigments
- Check the Safety Data Sheets (SDS) of all chemical formulations to ensure that none of the above listed heavy metals are listed as ingredients.
- Perform risk-based checks of your chemical suppliers' formulations by submitting samples to a third-party laboratory for testing to ensure the ZDHC MRSL limits are not exceeded whenever applicable.<sup>2</sup>

### Safer Alternatives

- There are many alternatives to pigments and trims containing heavy metals. You may need to make a higher upfront investment and conduct periodic compliance testing to ensure you obtain these heavy metal-free alternatives.
- The following plastic stabilizers do not contain heavy metals or restricted organotins:
  - Calcium-zinc stabilizers may be used in the form of metal carboxylates. These stabilizers are suitable for production of products with a high degree of clarity, good mechanical properties, excellent organoleptic properties and good weatherability.
  - Organic-based stabilizers are calcium-zinc stabilizers with zinc nearly or completely replaced with organic co-stabilizers. Benefits of these stabilizers include low migration, low odor, low VOC emissions, good initial color, and excellent transparency.

### Additional Information

- Visit ECHA's Candidate List of substances of very high concern to view dossiers for many restricted substances <https://echa.europa.eu/candidate-list-table>.
- Agency for Toxic Substances and Disease Registry (ATSDR) (<https://www.atsdr.cdc.gov/ToxProfiles/>)

### References

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<sup>1</sup> Apparel and Footwear International RSL Management Group Restricted Substances List (AFIRM RSL) <http://afirm-group.com/afirm-rsl/>

<sup>2</sup> ZDHC Manufacturing Restricted Substances List (ZDHC MRSL) [https://www.roadmaptozero.com/mrsl\\_online/](https://www.roadmaptozero.com/mrsl_online/)