

# Advice & Counsel



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## "Verboten"

Dear Advice & Counsel,

We have several clients who produce parts for General Motors. Recently, we are getting requests to certify that the electroplated deposits are free of various "hazardous" substances such as hexavalent chromium, mercury, lead, etc.

I'm not sure what's going on here. We apply a conversion coating process that is supposed to be free of hexavalent chromium, but how can I be sure?

Signed,  
W. Y. Now

Dear Ms. Now,

I suspect the requests are related to a new GM specification, GMW3059, titled "Restricted and Reportable Substances for Parts" dated May, 2005. The subject is so hot that GM has set up a website [www.gmw3059.com](http://www.gmw3059.com). Another website you might wish to visit is the Global Automotive Declarable Substances List ([www.gadsl.org](http://www.gadsl.org)).

This is an effort on the part of GM to comply with regulations contemplated or passed by the European Union and various nations of the world.

The specification applies to materials or components purchased by GM, but does not apply to items that are designed/manufactured by the supplier (black box items).

The new specification separates hazardous substances into two categories:

### **Prohibited and Declaration Required**

The specification requires that surface treatments not contain the identified hazardous substance above the specified limit. The content calculation is based upon the weight of the surface treatment, not the entire weight of the assembly/part.

Prohibited substances can only be used if technical requirements make substitution impossible, and then only with prior permission for the deviation.

For substances requiring declaration, the supplier must use them with an effort at achieving the highest level of safety and environmental compatibility. These substances must be replaced by non-listed substances as soon as technology, availability and economics allows.

With some exceptions, GMW3059 requires suppliers to input the full material composition of their parts including prohibited and declared substances, into the International Material Data System (<http://www.mdssystem.com>). This fulfills the reporting requirements of GMW3059.

A little bit about the GADSL:

### **Criteria for Declarable Substances**

The decision to list a substance on the GADSL was based on the following criteria:

- The substance should be expected to be present in a material or part in the vehicle. Either of the following conditions should apply:
  - The substance is regulated, or is projected to be regulated by a governmental agency or authority, or
  - It is demonstrated, by testing under OECD (Organization for Economic Cooperation & Development) guidelines for testing chemicals, conducted under Good Laboratory Practice (according to the OECD Principles on Good Laboratory Practice as revised in 1997), that the substance may be associated with a significant hazard to human health and/or the environment, and its presence in a material or part in a vehicle may create a significant risk to human health and/or the environment. Other scientifically valid methodology, based on the weight of evidence, may also be considered.
- A substance that causes a functional problem in vehicle design may be included if its presence in a vehicle part exceeds a level shown to be problematic by an international industry standard test.
- Reportable threshold levels will be based on the lowest level required by regulation or reasonably required by scientific evaluation.

### **Declarable Substance Classification**

A declarable substance when present in a material or part in a vehicle will be shown on the GADSL as "P" or "D", defined as follows:

#### **P = Prohibited**

A substance designated "P" is either prohibited by regulation for use in certain applications or may not exceed regulated threshold limits.

#### **D = Declarable**

A substance designated "D" must be declared if it exceeds the defined threshold limits.

Depending on its specific application, the same substance could be classified "P" in one end use, and "D" in another end use. When this is the case, both classifications for the substance will be shown on the GADSL with examples under the application column.

Declaration thresholds are defined by specific application of the substance in automotive parts. Any declarable substance below the declaration level does not have to be reported. These levels, unless otherwise indicated, are 0.1 g/100g (weight %) of non-separable, homogeneous materials, not on the total content in the component or assembly.

### **Reason Codes**

Reason codes have been developed to explain why a substance has been included in the GADSL. Each declarable substance will be listed with one of the following reason codes to facilitate dialog within the supply chain:

#### **LR = Legally Regulated**

A substance legally regulated because its use in a vehicle part or material poses a significant risk to health and/or the environment.

#### **FA = For Assessment**

A substance projected to be regulated by government agencies, upon decision by the GASG Steering Committee.

## FI = For Information

A substance tracked for information purposes only, upon decision by the GASG Steering Committee. After discussion at the GASG Steering Committee and on an exceptional basis, an OEM may include an individual substance or family of substances on the list under this (FI) reason code.

LR, FA and FI substances should not be construed to mean that the substance is prohibited from being used in a vehicle part, or is to be de-selected from use.

Individual substances should be listed unless all substance members of the family, or category, meet the criteria for being declarable.

## Change Management Process

The GADSL will be updated and published annually in February according to improved knowledge in order to achieve a high standard of product safety and environment protection. At the latest 12 months after the publication date, any declaration should be performed according to this updated version.

Requested changes to the GADSL must be received by July 15 each year in order to be considered for the next version. For this input, comments and questions please contact one of the persons listed on the GADSL website.

Your last question is answered to some degree in Table 1. Note that we believe there is a typographical error in Table 1 (not ours). The requirement in Table 1 for hexavalent chromium is listed as **0.1 µg/cm² by weight**. This makes no sense, as µg/cm² is not "by weight" (it's by area). The GADSL list has a maximum requirement of 0.1%, which would be by weight. To make matters more complex, the test procedure in GMW3034 yields result in µg/cm². We hope GM resolves this conflict ASAP.

To test your parts for the absence of hexavalent chromium you need to have the parts tested per GMW3034. You will need to have enough of the parts or a section of a large part to yield a surface area of 50 +/- 5 cm². The procedure involves boiling the part(s) in 50 mL deionized water

for 5 minutes. The water is then reacted with an indicator to develop a pink color in the presence of hexavalent chromium. The developed color is measured against a standard blank using a colorimeter or spectrophotometer. According to GMW3034, if the developed color is less dense than the blank, the test result is considered to be less than 0.01 µg/cm², and presumably you have passed the test.

However, this would not yield results that can be used for the GADSL. For that, you would need to weigh the parts, strip off the coating and re-weigh to get the coating weight, test the stripping solution and calculate how much hexavalent chromium is present as a function of the coating weight to get a % reading.

Note that there are numerous interferences to the procedure, and some laboratories have erroneously reported the presence of hexavalent chromium, when ion chromatography proved it was absent, so I would recommend you leave the testing to a reliable laboratory. *P&S*

Table 1

Substance	Rating	Requirement Detail	Tolerances/Test Method Detail
All substances listed on the GADSL are declarable in GMW3059. All Substances listed as prohibited on the GADSL are prohibited in GMW3059		See www.gadsl.org	
GM requirements IN ADDITION to the GADSL:			
Benzene	P>100ppm	Prohibition applies to non-fuel applications only	
Cadmium & Compounds	P>0	Exemptions to P according to Directive 2000/53/ EC Annex II	A maximum concentration of 100ppm by weight and per homogenous material shall be tolerated provided that the cadmium is not intentionally introduced
Chromium VI-Salt	D>0	P for all applications except for corrosion preventative coatings. For corrosion preventative coatings: P for all parts to be released the first time for new vehicle lines incl. their powertrain units put on the market as of MY 04 for the GME Brands Opel and Saab. Newer vehicle lines means all new types which will get whole vehicle type approval (WVTA). Will be P My 07 for all applications for the GME Brands Opel and Saab. Will be P for all applications as of MY 05 for all other regions.	For applications where the hexavalent chromium is not leachable: A maximum concentration of 1000ppm by weight and per homogenous material shall be tolerated provided that the hexavalent chromium is not intentionally introduced. Test Method: A test for total chromium (for example) can be used to determine that the applications is hexavalent chromium free.  For applications where the hexavalent chromium is leachable: A maximum concentration <b>of 0.1 µg/cm² by weight</b> and per homogenous material shall be tolerated provided that the hexavalent chromium is not intentionally introduced. Test method: GMW3034
Formaldehyde	P>10ppm	The prohibition applies to passenger compartment parts only. Formaldehyde is D for all parts per the GADSL	Test Method GME60271
Lead & Compounds	P>0	Exceptions to P according to Directive 2000/53/ EC Annex II. Lead in wheel balance weights for non-European marketed vehicles is declarable and will be prohibited July 2005.	Determined from knowledge of formulation or by chemical analysis using a valid analytical method. A maximum concentration of 1000ppm by weight and per homogenous material shall be tolerated provided that the lead is not intentionally introduced.
Mercury Compounds	P>0	Exceptions to P according to Directive 2000/53/ EC Annex II.	A maximum concentration of 1000ppm by weight and per homogenous material shall be tolerated provided that the mercury is not intentionally introduced.
Polybrominated Terphenyls	P>0.1 %		
Radioactive Substances	D>background		Also on GADSL. Threshold to be communized with next version