Guidelines for the creation of Material Data Sheets (MDSs) in the International Material Data System (IMDS) for Karma Automotive (K.A.) and for gaining an Accepted status.

Introduction -
In general, Karma Automotive requires that suppliers follow the IMDS Recommendations 001 to 023 as listed on the IMDS / DXC website. The IMDS Recommendations provide definitions - direct and implied - for items like Components, (top-level components, objects, and sub-components), semi-components and articles, Materials, Basic Substances, Tree-Structures, and Classifications.

The IMDS Recommendations list rules for the creation of an MDS, which must be "adhered to". Exceptions to compliance with a rule may be granted if the Supplier provides compelling reasons in writing, which would warrant an exception.

The IMDS Recommendations provide Guidelines, which define "Best Practices methods" to describe objects and articles and to disclose and to declare Materials and Basic Substances. Since a Material Data Sheet is a Production Part Approval Process document in-situ in the IMDS, K.A. requires the usage of the Best Practice methods. This doctrine is best explained by the question: Why would you use anything less than a "Best Practice" for the PPAP package? Also, since the data is for a PPAP document, all data in an MDS is required to be accurate and complete. One portion of Best Practices is to submit an efficiently written Tree Structure. Another portion of Best Practices is the effort for Continuous Improvement for the MDSs.

Getting started in the IMDS:
Open the webpage: www.mdsystem.com; then click on: New at IMDS?
Or click on: Help/Contact/IMDS Service Centers.
For the step by step procedure for creating a material in the IMDS system, please access: https://public.mdsystem.com/documents/10906/16811/IMDS+Create+MDS+Tips+Material.pdf/11ee4395-31de-4b4a-a230-6e3b34d2e98d
For the step by step procedure for creating a component in the IMDS system, please access: https://public.mdsystem.com/documents/10906/16811/IMDS+Create+MDS+Tips_Component.pdf/426cf575-8398-474e-9c62-8f93df7dbb32

The IMDS Supplier Contact
Each Supplier must identify an active IMDS contact and furnish a valid e-mail address, also. In order to honor the non-disclosure agreements between companies and to maintain the status of the disclosures of Materials as highly confidential, then, communications about the MDSs must be restricted to the IMDS Supplier contact and the K.A. IMDS contact(s).
A Review of Definitions for the organization of a proper Tree Structure and K.A.'s interpretation of IMDS Definitions for a Material, a semi-Component, and a sub-Component.

A **Material** is an homogeneous substance, compound, or preparation in an end-state condition, whose elements, molecules, grains, or mixtures can be separated only by destructive mechanical methods such as grinding, scraping, chiseling, abrading, etc.

An semi-Component **Article** is a laminate, whose features can be separated only by destructive mechanical methods such as grinding, scraping, chiseling, prying, snipping, cutting, etc. The laminate is viewed as having bound or fused layers of Materials, which are not easily separated.

A sub-component is either a singular **object** with one Material or it is an **assembly**, whose parts can be separated with the usage of a variety of simple, mechanical tools such as wrenches, sockets, pliers, dowel-punches, and screw-drivers or torx-head drivers.

**The IMDS and the Projective Survey for ELV**

Since one of the primary purposes of the IMDS is to furnish data on Materials to complete a survey of a vehicle's environmental footprint, Karma Automotive's approach is aligned with the efforts of the Global Automotive Stakeholders Group and the GADSL.org. K.A. makes use of the Global Automotive Declarable Substance List for each evaluation of a Material Data Sheet.

**Global Automotive Declarable Substance List (GADSL)**


Major objectives of automotive product development include continuous improvements in quality, safety, and the reduction of environmental impact throughout vehicle the life cycle. As much as possible, these objectives should be achieved in an efficient, cost effective way to optimize consumer value. A large number of construction, operational, and processing materials are used in the automotive manufacturing chain, and their selection and proper use can have significant impact on these objectives.
To meet these objectives, an ongoing dialogue and information flow within the global automotive supply chain, including automobile manufacturers, tier suppliers and material suppliers, has been established, called the Global Automotive Stakeholder Group (GASG). Early information and dialogue up and down the supply chain will help facilitate compliance with current and future regulations, as well as take into account customer requirements to ensure sustainable products. Optimized handling of relevant information flow can help automobile manufacturers meet existing and projected requirements in a consistent, understandable and efficient way.

The product of the GASG dialogue is the Global Automotive Declarable Substance List (GADSL). The GADSL covers declarations of certain information about substances relevant to parts and materials supplied by the supply chain to automobile manufacturers. The information is applicable to the use of these parts or materials in the production of a vehicle up to its usage and relevant to the vehicle’s re-use or waste disposal.

The scope is to cover declarable substances in the flow of information relevant to parts and materials supplied throughout the automotive value chain, from production to the end of life phase. **The GADSL only covers substances that are expected to be present in a material or part that remains in the vehicle or part at point of sale.** End Quotes.

[K.A. defines "expected to be present" as the end-state composition of a Material as "remains" - as the object or article rides, (resides, remains) in a vehicle.]

**GADSL Definitions** - quoting:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part</td>
<td>A manufactured object made up of one or more homogeneous material(s).</td>
</tr>
<tr>
<td>Component</td>
<td>An element of a vehicle that has a defined weight and shape.</td>
</tr>
<tr>
<td></td>
<td>[Per K.A. - an &quot;object&quot; of a vehicle that has a defined weight and shape.</td>
</tr>
<tr>
<td></td>
<td>K.A. restricts the word &quot;Element&quot; to chemistry as it relates to the &quot;Table</td>
</tr>
<tr>
<td></td>
<td>of the Periodic Elements&quot; as published by the IUPAC].</td>
</tr>
<tr>
<td>Products/articles</td>
<td>Materials which have been transformed during production to take a specific</td>
</tr>
<tr>
<td></td>
<td>shape, surface or form, which has a greater influence on their function</td>
</tr>
<tr>
<td></td>
<td>than their chemical composition does.</td>
</tr>
<tr>
<td>Materials</td>
<td>Chemical elements, chemical compounds or preparations thereof in finished</td>
</tr>
<tr>
<td></td>
<td>state used to manufacture products/articles.</td>
</tr>
<tr>
<td></td>
<td>[Per K.A. ...used to manufacture objects/articles.]</td>
</tr>
</tbody>
</table>
Substances: Chemical elements or chemical compounds as parts of materials or preparations. 
[Per K.A. - Chemical elements or chemical compounds as portions of materials or preparations.]
Preparations: Mixtures, composed of two or more substances. End quote.  
[per K.A. - bonded mixtures, includes cohesive bonds and adhesive bonds, for Adhesives, RP Oils, Greases, etc.; fused-mixtures includes - Glass, pigments and solids of Lacquers, powder-coat paint.]

[*This list of definitions was re-ordered to match the Tree Structure of a Material Data Sheet, (an MDS), in the IMDS. Also, the Parts was changed to Part to match the singular-case of the definition.]

Resume quotes - GADSL.org.

4. Substance declaration in IMDS
4.1 Information about reporting the presence of declarable substances
The International Material Data System (IMDS) contains detailed information on materials and substances in automobile parts. IMDS Recommendations give instructions on how to report the presence of declarable substances in parts and materials. In addition, specific requirements of individual vehicle manufacturers can be found. GADSL is standard in IMDS.

4.2 Function of GADSL and IMDS Basic Substance List (IMDS-BSL)
The complete list of substances in IMDS is called the BSL “Basic Substance List”. To simplify identification and reporting of GADSL-listed substances they are marked separately with D or P in IMDS System. [K.A. explanation - "marked as Declarable or Prohibited in the IMDS."


Definitions of some of the IMDSs' key-terms - K.A.'s interpretation

Top-Level Component - the item, object, or article, which is PPAP'd.

sub-Component - an object, which is set at an index-level below the Top-Level Component. An item or object, which comprises a portion of the Top-Level Component. If the object can be wholly disassembled with various types of wrenches, pliers, drift-pins, and screwdrivers, then, a Child-node sub-Component is established for each portion of the object and its Material is disclosed at the next stepped-down index-level of the Tree Structure. [Printed Circuit Boards and Wire Harnesses are exceptions by an IMDS rule.]
**semi-Component** - an Article, which is composed of laminated, clad, woven, sewn, bonded, or fused portions of Materials. Some portions of the Article may involve cut-to-length Thread, cut-to-size fabrics, fused weld filler-metal, buttons or dollops of solder, glue, carrier-stock, etc.

In general, an Article may be composed as a configured laminate, a conformal laminate, a congruent laminate, a cylindrical laminate, a ribbon-laminate, a circular-laminate, etc.

Examples of Articles, whose construction is best confirmed and described as a semi-Component, which is accompanied by a Flat Bill of Materials, an FBOM.

Configured laminate - a Printed Circuit Board, which is dressed with micro-electronic devices.

Conformal laminate - a shell of plastic, which is bonded or fused to a layer of foam; two brackets joined with weld-filler metal; weld studs, which are fused to a plate of metal via resistance welding or projection welding; a sleeve of plastic, which is over-molded to one-half of the surface area of a tongue of stainless steel.

Congruent laminate - a shielding tape, which has a layer of foil, a layer of a fabric-carrier, and layers of adhesive; 3 layers of plated-metal, such as Chromium (top), Nickel (middle), and Copper (bottom and adhered to) and on a Plastic substrate; a bolt with a layer of zinc, which is which is over-coated with chromium-oxide, and sealed with a plastisol coating.

In nearly all instances, the composition of a semi-Component Article - see examples above - is best disclosed with one Flat Bill of Materials.

In nearly all instances, it is inefficient to create a Tree Structure with a Parent-node sub-Component, which has multiple Child-node semi-Components.

**Guidance for the proper format for data entries into key textboxes of a Material Data Sheet:**

A listing of key textboxes -
Part/Item No. textbox
Part Description (for a Top-Level Component)
Part Description (for a sub-Component)
Article Name (for a semi-Component)
Name (for a Material)
Classification of a Material
Std. Mat No. ( Standard Material Number [code or designation])
Symbol (for a Material with Classifications of 5.x or 6.x)
Guidance for the Part/Item No. textbox

The Part Number must be consigned from the K.A. Engineering Bill of Materials or the K.A. Manufacturing Bill of Materials. For Components, which are painted with a Class A option-code, K.A. provides an over-arching Part Number, which ends with the letter code - CC. The Supplier must use the Part/Item No. which ends with CC - common color. The Supplier must obtain pre-approval from the IMDS contact at K.A. for any exception with regards to the entry of a Part Number, which ends with an actual K.A. option code. There is a similar situation for fabrics and interior components, which bear dyes or tints via option codes. The same guidance statements apply - usage of a Part No., which ends as - CC.

Guidance for the Part Description of the Top-Level Component

The Part Description must be an exact match for the K.A. Part Description, which is corresponds to the Part Number on the K.A. Engineering Bill of Materials or Manufacturing Bill of Materials. The Supplier is not permitted to introduce abbreviations of the K.A. terms or phrases or to truncate the Part Description of the Top-Level component. The Supplier must not introduce the Name of this company or the Names of any of its vehicles as a prefix or a suffix to the Part Description of the K.A. Bill of Materials.

Guidance for the Part Description textbox for the sub-Component

The entry in the Part Description textbox must identify a common automotive item or object with a well-targeted phrase or a brief, accurate name. The name or phrase must be placed in the first-position of the textbox.

The entry in the Part Description textbox must not contain any of the characters, which are banned from entry in the - Reason for Denial - textbox, because such characters will cause the transmission of the Reason for Denial to be blocked, when the Part Description is quoted in the RfD textbox. Such characters include a quote mark(“), which would be used to indicate inches, an (%), an percent sign, (…), a series of periods, (&), an ampersand, etc.

Next, the entry in the textbox for the Part Description must not contain the Name of a Material or Materials, because one of the primary purposes of the Tree Structure is to shield the Name of each Material and Basic Substance out-of-view in the lower index-levels. The Tree Structure is designed for the confidential disclosure of the Materials / Substances, such that the Trade Secrets of the Supplier, and, simultaneously, the Trade Secrets of the Recipient are sequestered out-of-view. There is no sound reason to disclose the Name of a Material or of a Basic Substance out-of-order in the Tree Structure or to make a GADSL disclaimer.
Also, the entry in textbox for the Part Description must not consist of a Trade name or a commercial code. The Trade name / commercial code is not allowed, first, because the Trade name or code rarely states an accurate Name or phrase in the first-position of the textbox. Secondly, the Trade name / commercial code is fairly viewed as advertising. K.A. does not permit such advertising to appear in the textboxes for the Part Description, Article Name, or Material on the Ingredients page. Thirdly, the Trade name / code, most often, is not sufficiently descriptive so as to enable the Recipient to easily recognize a common, automotive object and to further the evaluation of the reasonableness of the composition and disclosure(s).

**Guidance for the Article Name textbox for the semi-Component**

The entry in the Article Name textbox must identify common automotive features or items or objects with a well-targeted phrase or a brief, accurate name. The phrase or name must be placed in the first-position of the textbox.

The entry in the Article Name textbox must not contain any of the characters, which are banned from entry in the - Reason for Denial - textbox, because such characters will cause the transmission of the Reason for Denial to be blocked, when the Article Name is quoted in the RfD textbox. Such characters include a quote mark ("), which would be used to indicate inches, and (%), percent sign, (…) a series of periods, (&) and ampersand, etc.

Next, the entry in the textbox for the Article Name must not contain the Name of a Material or Materials, because one of the primary purposes of the Tree Structure is to shield the Name of each Material and Basic Substance out-of-view in the lower index-levels. The Tree Structure is designed for the confidential disclosure of the Materials / Substances, such that the Trade Secrets of the Supplier, and, simultaneously, the Trade Secrets of the Recipient are sequestered out-of-view. There is no sound reason to disclose the Name of a Material or of a Basic Substance out-of-order in the Tree Structure or to make a GADSL disclaimer.

Also, the entry in textbox for the Article Name must not consist of a Trade name or a commercial code. The Trade name / commercial code is not allowed, first, because the Trade name or code rarely states an accurate Name or phrase in the first-position of the textbox. Secondly, the Trade name / commercial code is fairly viewed as advertising. K.A. does not permit such advertising to appear in the textboxes for the Part Description, Article Name, or Material on the Ingredients page. Thirdly, the Trade name / code, most often, is not sufficiently descriptive so as to enable the Recipient to easily recognize a common, automotive object and to further the evaluation of the reasonableness of the composition and disclosure(s) of the Materials and Basic Substances for this survey.
Guidance for the Material Name textbox

The Name of a Material must be determined by and coordinated with its Basic Substance(s).
The Name of a Material must be placed in the first-position of the textbox.
There are many instances for the disclosure of a Material whereby the Name of the Basic Substance and the Name of the Material are exactly the same. Typically, the identity of a Material is best disclosed with a common Material Science, automotive code or phrase.

A Trade name, by rule, is not an acceptable entry or item for a textbox.
A textbox entry, with the Name of a Material and the Trade name (or a commercial code) written together, is not acceptable. For metals, plastics, and elastomers, (rubber-like materials), the Name of a Material should be derived from applicable norms or public standards of national or international engineering organizations. If no norm or standard applies, then, the Name of the Material must be clear and descriptive and specific to its Basic Substance(s).

If the Name of a Material includes the Symbol(s) for chemical elements, which are published in the "International Periodic Table of the Elements" by the International Union of Pure and Applied Chemists, (the IUPAC), then, the Symbol(s) must quoted accurately in all instances.

Caution - Some enterprise organizations - like JAMA - publish codes / designations for Materials, which are not grounded in Material Science. Example - JAMA published the code - SAC - for a solder, which is a Tin Alloy (Stannum), which has deliberate additions of Silver and Copper. For JAMA, the S stands for Stannum (Tin), A for Argentum (Silver) and the C stands for Copper.

Guidance for the Material Name textbox - continued

Each entry into the textbox to Name a Material must qualify as providing the identity of a Material or a Basic Substance, which is present. K.A. does not permit the usage of the term - Leadframe - in any textbox to Name a Material. Such a term introduces confusion as to the presence - or not - of Lead, as Plumbum. Since Lead is a Prohibited Substance, a term, which creates confusion about its presence, is not acceptable. K.A. only allows the term - lead - in any form or phrase in a Material textbox, when plumbum is actually present as an elemental Basic Substance or present in a compound. Similarly, K.A. does permit the phrase - Lead free - to be written into the textbox to Name a Material. Since the purpose of the MDS is to disclose the Substances, which are present in the Component, then, it is never necessary to disclaim the presence of Plumbum or Lead. Taking note of the "free-standing term" - Lead, then, there is
immediately a confusion as to whether or not Lead is present in the List of Basic Substances. Thus, the usage of l-e-a-d must qualify as providing the Name of a Material, which is present.

The entry in the (Material) Name textbox must not contain any of the characters, which are banned from entry in the - Reason for Denial - textbox, because such characters will cause the transmission of the Reason for Denial to be blocked, when the Material Name is quoted in the RfD textbox. Such characters include a quote mark(“), which would be used to indicate inches, and (%), percent sign, (....) a series of periods, (&) and ampersand, etc.

Next, the entry in the textbox for the (Material) Name must not contain the Name of an object or item - a sub-Component, nor contain an Article Name or the Name of a Laminate - a semi-Component. The IMDS Recommendations establish the textboxes for Part Descriptions and for Article Names at the index-levels above the icons and textboxes for Materials. There is is no sound reason to write a Part Description or an Article Name into a textbox, which discloses the Name of a Material. Such information, when present in a Material Name textbox, is written out-of-order to the format of the Tree Structure of the IMDS Recommendations.

**Guidance for a List of Basic Substances**

The Basic Substance or the List of Basic Substances must establish the identity of the Material and represent the homogeneity of the Parent-node Material. The disclosure of a Substance in an End-State condition must represent engineering intent whereby said Substance was designed to be present in the final product, in the finished-goods.

The disclosure of the composition as a Process Chemical, as a starter-chemical, which, subsequently, had undergone a significant transformation or which actually exists in a different phase, is not permitted. Plasticizers, catalysts, and hardeners are Process INPUT Chemicals, which become fully integrated into the principal Substance(s) of the Material. The weight or the proportion of the plasticizer, catalyst, or hardener must be integrated into the weight of the principal Substance(s). Such INPUTS must not be reported as independent of the Principal Basic Substances(s) in the List of Basic Substances in an End-State Material.

Inadvertent Process-Chemical residues must not be disclosed, when present in miniscule amounts, which are not routinely proven to be present in the intended Material.

A single List of Basic Substances for a Material must not confuse the composition of discrete layers of laminates into a single entry, which misrepresents homogeneity. Example - A bracket is plated with three discrete layers of metals - Copper on a substrate, Nickel on
the Copper, and Chromium on the Nickel. The List of Basic Substances must not be written with the confusion of Cu, Ni, and Cr as though homogeneous. The discrete layers must be named at the index-level of a Material with the disclosure of each metal as a separate Material: as a Material, whose Name was written as Copper; as a Material, whose Name was written as Nickel; and a third Material, whose Name was written as - Chromium. The stacked and discrete layers of Materials must not be consolidated and confused into a single List of Basic Substances.

Regulated Substances

Substances, which are widely recognized as "regulated" - cadmium, lead, mercury, and hexavalent chromium - must be reported in the instances where each exceeds 0.1% by weight of the affected Material and for Cadmium, when it is present in a Material in an amount, which exceeds 0.01% by weight of the affected Material.

Example: Since Lead, Plumbum, is a an Application Relevant Material, an App. Rel. prohibited Material, an appropriate application code must be selected for this material / substance among those currently in force in the latest version of ELV – Annex II. See mdsystem.com. Select the correct application among those currently in force in ELV Annex II.
The List of Applications is available at:
https://public.mdsystem.com/documents/10906/17094 /Substance_Application.xls

Application relevant substances, aka - Appl. rel. subst.

On the Ingredients Details page and for the Basic Substance's index-level, there is a section, whose title is - Basic substance groups. Substances, which are categorized as - Appl. rel. subst. - as Application relevant substances - are denoted in this section. The Supplier must acknowledge the presence of all Application Relevant Substances and understand that any error(s) as related to the disclosure of the End State composition for an - Appl. rel. subst. - is a basis for the "Reason for Denial" of acceptance, that is, a basis for Rejection of the MDS.

Example of an Appl. rel. subst. - Polycyclic aromatic hydrocarbons
The Basic Substance, which is coded as - PAHs - as Polycyclic aromatic hydrocarbons, is a common constituent of certain Distillate Oils - of Naphthenic Petroleum Oils and of Paraffinic Petroleum Oils. These types of oils are often used as Process INPUT Chemicals in the molding or extrusion of thermoplastic elastomers and elastomers. When the finished object ejects from a molding or extrusion process, the oils have undergone substantial transformation and must not be characterized or disclosed as "Distillates". Petrolatum-oxidized is descriptive.
Caution - Distillate Oils, which contain PAHs, are not flagged as Red because the Oils are Process INPUT Chemicals and NOT End-State chemicals. The inclusion of such Oils in a List of Basic Substances will not trigger a Red-flag via a GADSL related-code even though the PAHs are Appl. rel. substances, which are regulated and prohibited Material content of the End State.

**GADSL related disclosures of Basic Substances**
All intended substances, which are present in an object, item, or article, and which are contained in "The Global Automotive Declarable Substance List" (GADSL), MUST be disclosed in a Material Data Sheet in the IMDS. Threshold for declaration - All GADSL substances must be declared if present at or above 0.1 % by weight, unless a lower threshold is listed in regulations, which cite the substance as - application-relevant.

**Guidance for the entry to provide a Classification of a Material**
K.A. requires that the most descriptive Classification code be assigned to a Material. The Classification of 8.1 Electronics must not be used for a Material, which can be declared with a more descriptive Classification code. Example - a Copper Alloy must show a Classification of 3.2 and not 8.1.

**Guidance for the textbox for a Std. Mat No. (Standard Material Number, a code or designation)**
The code or designation, which is entered into the textbox to provide the Std. Mat No., must be sanctioned in an active national publication or international publication, which provides the composition of a Material for any of the Classifications 1, 2, 3, or 4. The organization, which published the code or designation for the composition, must be recognized by the IMDS as competent to provide such data. Caution - K.A. does not accept a code or designation, which begins with the letters - AISI. The AISI, the American Iron and Steel Institute, began issuing disclaimers for the composition of Irons and Steels in 1995. Circa the calendar year, 2000, the SAE noted that the AISI does not support compositional data. Any reference to a composition code from the AISI has been obsolete for more than 20 years.

**Guidance for the textbox for a Symbol (for a Material with Classifications of 5.x or 6.x.**
Three international standards, the ISO 1043 series plus ISO 1629 and ISO 18064, provide codes, which relate to the composition of Materials in Classifications 5x and 6x. The entry for the textbox for the Symbol can be selected from Tables in the IMDS. The Symbol should be enhanced to represent a complete disclosure of the principal constituents of each Material plus 10% or more of any filler substance(s) or fire-retardant substance(s). It is a Best Practice to use a complete Symbol as the entry into a textbox to Name the Material.
Caution - a code for a Plasticizer must not be written into the Symbol because the Plasticizer was fully integrated into the principal Material(s). A Plasticizer is not a discrete constituent chemical in the End-State Material - except as an inadvertent residue.

**Accuracy of the Weight of the Top-Level Component**

The deviation determined by the IMDS system between a measured-weight and a calculated-weight must be "within tolerance" in the MDS. Deviations above 5% will likely be rejected. Deviations of concentrations and weights shall only display real variations. Therefore, the maximum tolerance range is ±5%.

K.A. applies a 5%-by-weight maximum as a limit for the amount of Substances like - Further Additives not to declare, Misc. - not to declare, and Pigment-portion not to declare, etc. in relation to the sub-Component object or to the semi-Component Article.

**The "Last Eyes and Last Hands on the MDS" Doctrine**

The IMDS contact for the Supplier had the "last eyes and last hands on" (last possession of), the Material Data Sheet prior to submission to a Recipient. When the IMDS contact at the Supplier accepted the Terms of Use, the Supplier-contact accepted all responsibility to make certain that each section of the Tree Structure of this Material Data Sheet, (MDS), was structured per the IMDS Recommendations and the rules, embedded therein, to ensure an accurate and complete disclosure of the Material composition of the Component, as the MDS is submitted to the Recipient, to K.A. The IMDS Supplier-contact has all responsibility for all content. If the Supplier-contact receives written notice of deficient sections of the MDS, then, the contact has the responsibility to make a correction or to secure a correction from a sub-Tier Supplier. If there is not sufficient cooperation from the sub-Tier Supplier, then, the Tier 1 Supplier-contact must replace the deficient section of the MDS with the best information / best data available.

Rejected MDSs must be edited and resubmitted as soon as is practicable.

**K.A. has 3 categories for deficiencies of the MDS, as submitted and evaluated - Critical Flaws, Major Flaws, and Minor Flaws**

**Examples of Critical Flaws (K.A. will not accept the MDS into IMDS).**

b. The Part Description for the Top-Level Component does not match Karma Automotive PPAP documents and does not correspond to the K.A. Part Number.
c. The failure to use the correct symbols of the International Periodic Table of the Elements as published by the IUPAC.
d. Unacceptable usage of a prohibited/restricted substance. (The usage does not fit the Application exemptions of ELV Annex II and the IMDS Recommendations).
e. Failure to use a ZVEI Committee semi-Component to disclose and declare the composition of a Printed Circuit Board, which is dressed with micro-electronic devices and connectors.
f. Excessive number of warnings and errors that would add up to significant inaccuracies for the recyclability calculation.
g. Usage of the KARMA name or trademarks to describe or to name Components, Semi-components, or Materials. Since parts of IMDS submittals are often “recycled” to other customers, this could jeopardize confidentiality of the exchange of data between K.A. and the supplier.
h. Misrepresentation of Lead, Pb, with the symbol code - PB. (PB is polybutylene.) Any similar misrepresentation of an Application Relevant Substance.
i. The deliberate disclosure of a dangerous or toxic chemical as a joke or a prank. Karma has noted three instances of the inclusion of Materials / Substances, which appear to be written to be deliberately inaccurate and whose declaration can only be described as a malicious attempt to damage K.A.‘s reputation with regards to Sustainability Engineering. One of the disclosures was named - tri-nitro toluene, aka TNT or dynamite. Another declaration claimed the presence of sodium azide - a munitions propellant and rocket fuel (not as part of a safety item.) The most recent disclosure claimed the presence of - Benzo[a]pyrene, a chemical, which is present in cigarette smoke. Benzo[a]pyrene is a potent mutagen and carcinogen. Let me assure the authors of such nonsense that K.A. understands the phrase, which begins with - blows smoke....
j. Submission of an MDS, which generated a significant Warning.

Summary for Critical Flaws - a single "critical flaw" will result in a Rejection - for a Reason for Denial - to be written on the Recipient page of the MDS.

Major Flaws

Major Flaws involve the failure write a proper Tree Structure, a failure to provide the proper disclosure of composition as described in the IMDS 001 - 023 Recommendations and a failure to provide the declarations of composition per the GADSL.

a. Incorrect Description of a Material and a wrong /incomplete List of Basic Substances, which comprise the Material. Mismatch for a Material and its Basic Substances. The usage of a Tradename to identify a material.
b. Confusion of multiple Materials into a single List of Basic Substances.
c. Failure to establish a proper Tree Structure or Description or a proper Article Name.
d. Incorrect Classification (category) of the Material.
e. Deviation of more than 5% between the measured weight and calculated weight.
f. Incorrect and/or missing Norms/Standards for Materials in IMDS Classifications 1 through 5 when the Material's weight is over 5 grams. If the Material weighs more than 5 grams, the most current Norm or Standard and code, which applies, must be written into the textbox.
g. Unnecessary "system generated" Warnings.
If a warning is unavoidable, as does occur for some unique items, it will be handled on a case by case basis.
h. An "Editorial / Disclaimer Comment" in the Remark section, which indicates that the full and accurate disclosure of composition was not submitted and that the Recipient must search outside of the IMDS for disclosures and declarations about the Materials / Substances.

Minor Flaws

a. The failure to post the name of the material into the "first position" of the textbox for the Name of a Material.
b. An "Editorial / Disclaimer Comment", which was written into the "Remark" section, which does not enhance the description of the Material. A "Remark", which contains legalisms and disclaimers, which are not consistent with a complete and accurate disclosure.
c. Typographical errors

A Minor Flaw will not usually trigger a "Rejection" by itself. Each Minor Flaw will be included in the "Reason for Denial" along with Critical Flaws or Major flaws. It is expected that all flaws will be corrected.

Summary for the List of Flaws -

The preceding rosters of Flaws describe many of the common deficiencies, which were noted in Material Data Sheets. The rosters do not describe all of the types of flaws. Again, this is a sampling among the many different types of deficiencies, which have been discovered during routine evaluations of these PPAP documents to determine if each is accurate and complete.
Warning Report
Since it is rare for an MDS to be written perfectly, nearly every report, which is accepted into the IMDS contains one or more errors. Hence, the typical status of such an MDS is - Accepted with error(s). There are circumstances where an MDS will be given an "Accepted with Errors" status in the IMDS, which is followed with a Warning Report, which is e-mailed to the Supplier. The purpose of the Warning Report is to make clear that the PPAP practice of Continuous Improvement must be applied by the Supplier to gain acceptance of a similar version of the MDS in the future.

Summary for the Guidelines
These Guidelines, while comprehensive, do not present the entire list of topics and issues, which aid acceptance of an MDS into the IMDS by a Recipient. Nor do the Guidelines provide all of the possible issues or deficiencies, which might be written into a Reason for Denial. When a Supplier puts their "best foot forward" on the pathway of Continuous Improvement, then, K.A. and the Supplier will have concordance and progress for Sustainability Engineering. Then, the projective survey for the environmental footprint of K.A.'s vehicles at ELV can be completed efficiently and accurately.
**Document Title:** Karma Automotive IMDS Guidelines  
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