

# Zinc A Basic Understanding of the EU Directives and How They Affect North American Zinc Die Casters

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RoHS...IMDS...WEEE...ELV...GADSL...REACH... These terms are all associated with the European Union (EU) Directives and legislation but are now beginning to have an effect on North American die casters. These terms have created many questions and some confusion to both North American die casting companies as well as Original Equipment Manufacturers (OEMs). The purpose of this article is to answer some of these questions, explain what these terms mean and to clearly state that zinc alloys are compliant to each of the directives and programs stemming from the EU.

## What Are the EU Directives?

The EU Directives are a series of objectives that require EU states to implement measures to achieve various environmental, safety, economic and cultural standards. Although there are many directives, three are of major interest to North American die casters:

- WEEE (Waste Electrical and Electronic Equipment Directive)
- RoHS (Restriction of Hazardous Substances Directive in electrical and electronic equipment)
- ELV (End of Life Vehicles Directive)

Love them — or hate them — these directives affect North America! Although North America is not part of the EU, many die casting companies export parts to EU states, and therefore the directives apply to parts made.

Aspects of these directives are now even being considered in North America. California has adopted one of the directives which is being called “California RoHS.” It is probably just a matter of time before other states or the federal government adopts similar legislation. Therefore, it is important for North American die casters to understand these EU directives, and how they apply to parts they produce.

### Waste Electrical & Electronic Equipment (WEEE) Directive

Each year, exciting and new electronic devices are developed and sold to the general public. These devices have become a staple in our societies and a way of life. Cell phones, radios, televisions, medical equipment are only a few of the gadgets we use every day.

These devices do not last forever and/or get replaced when the next generation of the device comes along. In most cases, the old devices get thrown away! The amount of electrical and electronic equipment in landfills has been

and continues to be a problem due to the various toxic materials that are used, which may eventually end up in the ground and can potentially harm the environment.

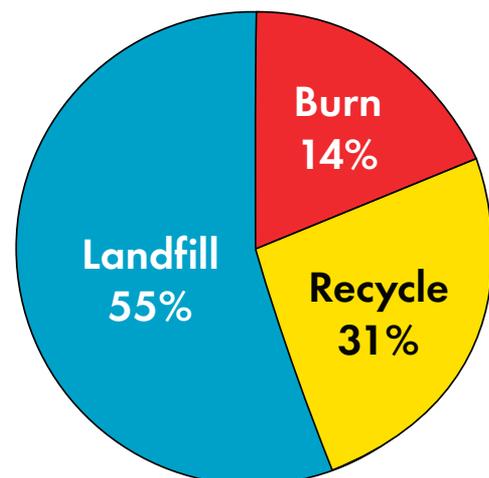
The WEEE directive requires that manufacturers of these components create an infrastructure of recycling to make it easier for the EU public to recycle electronic components. Although this directive doesn't apply directly to North American die casters, it is the driving force behind our next directive — RoHS.

### Restriction of Hazardous Substances (RoHS) Directive

The RoHS directive (pronounced “Rose” or “Row Haws” or “Rosh” or “R-O-H-S”) took effect on July 1, 2006. The purpose of RoHS is to “reduce the environmental impact of electrical or electronic products in the waste stream and improve the recyclability of that waste<sup>2</sup>.” This directive covers a very broad range of applications including electronic tools, monitoring and control instruments, toys, leisure, sporting and medical equipment, etc.

Companies (producers) that manufacture, rebrand or import electrical or electronic products are responsible for ensuring that their products are in compliance with this directive, therefore they must direct the actions of the various component, assembly and materials appropriately.

*In other words, if North American die casters are selling electrical or electronic parts that will eventually end up in an EU state, it must now be RoHS compliant as of July 1, 2006.*



*What We Do with Our Trash*

Table 1 -

Substance	CAS #	Classification	Threshold	Max Amount Found in Zinc Die Casting Alloys
Cadmium	7440-43-9	Prohibited if above threshold	0.01% (any intentionally introduced content must be reported)	0.006%
Lead	7440-92-1	Prohibited of above threshold	0.1% (any intentionally introduced content must be reported)	0.006%
Nickel	7440-02-0	Declarable if above threshold	0.1%	0.020%

To accomplish the purpose of RoHS, six substances are restricted in this directive including lead, mercury, cadmium, hexavalent chromium (chromium VI or Cr6+), polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE). The maximum concentrations for these substances are 0.1% (1,000 ppm), except for Cadmium, which is 0.01% (100 ppm).

#### End of Life Vehicles (ELV) Directive

The ELV directive is similar to the WEEE and RoHS directives in that it is designed to “limit the use of certain hazardous substances in the manufacture of new vehicles and automotive components” and to “promote the recyclability of their vehicles.”

*The IMDS System:* Due to this automotive specific directive, a database system called International Material Data System (IMDS) was created. IMDS is a computer-based material data system designed by automotive OEMs to log and track the flow of materials being used in automotive parts and accessories. IMDS requires all automotive suppliers to list the chemistry of all parts and components in assemblies and sub-assemblies in automotive applications. This allows OEMs to trace and eliminate hazardous substances at the source and to track the material flow of all substances entering the waste stream.

*In other words, the IMDS allows OEMs to track and control the amount of materials in automobiles for End-of-Life recycling purposes.*

As a North American die caster, it may be required by automotive OEMs and tier suppliers to register with the IMDS System and list the various die casting components being produced for automotive applications. Training is available through the system, and a customer service center is available to help through the process.

*GADSL:* A master list of declarable and prohibited materials for automotive applications called Global Automotive Declarable Substance List (GADSL) was developed by the major automotive manufacturers in response to the ELV and IMDS system. GADSL is the backbone of the IMDS System. It indicates whether materials or substances are prohibited, and it gives the threshold limits of materials which make them declarable in the system.

### Registration, Evaluation, Authorization of Chemicals (REACH)

REACH is an upcoming EU legislation (not a directive) that is designed to consolidate a multitude of EU legislative policies into one single system for governing chemicals (including alloys) in the EU. The projected date for the final version of REACH was December 2006, and “guidance documents” will be issued in the summer of 2007; therefore, the comments being made here are preliminary and subject to change upon review of the “guidance documents.”

The purposes of REACH are:

- Improve protection of human health and the environment from the risks of chemicals
- Enhance the competitiveness of the EU chemicals industry.

One of the most important factors of this legislation (for EU industry) is that it puts the burden of proof for testing the risk and assessment of new chemicals on industry instead of governmental agencies. This is expected to speed up the assessment process, making EU industry more competitive globally.

The International Zinc Association (IZA) has done much research and is taking the responsibility for doing additional research to ensure zinc alloys pass the required presentation to the EU Committee of Scientific Experts, who arbitrate the risk assessment process.

Companies who export alloy or pure metal (being called “preparations”) to EU states will need to register that “preparation,” and a consortium of companies is being developed to help share the cost of registration.

Die cast parts are considered “articles,” not “preparations,” and are therefore exempt to the registration requirements. Notification to EU environmental agencies is also not required because chemicals are not released from the die castings, and there are no Substances of Very High Concern (SVHC).

*In other words, North American die casting companies are not required to register or notify EU agencies when exporting zinc die castings to EU states.*

### How Do These Directives and Programs Relate to Zinc Die Castings?

Zinc die casting alloys that are produced in North America and specified by ASTM guidelines automatically comply with these EU directives (additional testing is required for the REACH). There are impurities in zinc alloys that are analyzed for quality purposes, but they are far below the published EU Directive thresholds and **do not need to be declared** with RoHS, IMDS (See Table 1) or REACH.

#### Cadmium and Lead Impurities

Elements such as cadmium and lead are impurities in zinc alloys and are refined to extremely low levels. They can cause intergranular corrosion in zinc alloys if found in amounts above the specified ASTM range; therefore, these elements are reported in shipment analytical reports to ensure proper quality levels. These elements are not reported for the EU Directives because the impurity levels are far below the required threshold limits for EU Directives and legislation.

### Hexavalent Chromium (Chromium VI or Cr6+)

Hexavalent chromium is **not** found in zinc alloys; however, it is often used as a protective coating on zinc parts. The threshold amount for hexavalent chrome for both the IMDS and RoHS is 0.1% by weight of homogenous material. The definition of "homogenous material" here means a material that cannot be separated mechanically. Currently, hexavalent chromium is declarable in automotive applications until July 1, 2007, at which time the coating is prohibited on zinc die castings in the EU states.

### Other Substances

RoHS also restricts mercury, polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE), which are not contained in zinc die casting alloys. GADSL also lists many other components unrelated to zinc die casting alloys for automotive applications.

### Conclusion

Although the countries of North America are not members of the European Union, the EU Directives do affect North American die casters. At first glance, these directives can be somewhat overwhelming and hard to understand. This article was written to help clarify the EU Directives and help zinc die casting companies be conversant regarding the fact that zinc die casting alloys comply with all the EU directives and legislation.

For further information regarding the EU Directives, please visit the websites found in the references.



### About the Author

Ryan Winter is the manager of customer engineering services for Eastern Alloys. His responsibilities include offering technical assistance to Eastern's die castings customers including defect analysis, energy audits, training seminars, etc. Winter is also very active in market development for the zinc die casting industry and gives marketing seminars to designers and end users of components, as well as developing markets for new and existing zinc alloys. He can be contacted at [rwinter@eazall.com](mailto:rwinter@eazall.com) for any zinc die casting related questions.

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