

ThreeBond TECHNICAL NEWS

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58

MSDS and Environmental Regulations

Introduction

Chemical substances are in use in a wide variety of applications, and the number of chemical substances used in Japanese industry is now said to have exceeded 50,000.

The author is in charge of a wide range of duties such as preparing MSDS for Three Bond products, overseeing compliance with regulations for overseas transportation and export trading management of hazardous products, supervising handling of hazardous and toxic materials, waste treatment, safety and sanitation in the workplace, and verifying compliance with the ISO 14001 standard in Three Bond.

In recent years, efforts have been made in Japan to promote the self-management of chemical substances by the companies that handle them, including the enactment of the Law Concerning Reporting etc. and the regulations for Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (the Chemical Substance Management Law, for short, or the PRTR Law) that was previously unheard in Japan, as well as major revisions to the guidelines for MSDS documentation. Summaries of these efforts are picked up in this issue as for the references to the efforts for chemical substance management in the workplace.

The number of chemical substances available on the market continues to increase, and regulations are also constantly changed in order to accommodate this growth. The present state of these regulations will be described here. The contents of this issue relate primarily to our main products (sealants, adhesives, rust-inhibiting lubricants) and the main materials for our products (epoxy, acrylic, and silicone), and will address the practical problems and questions actually reported when our customers handle these chemical substances.

Taking this opportunity, I would like to inform to our customers that Three Bond has acquired ISO 14001 certification and is working aggressively to find alternative substances that decreases impact to the environment.

Contents

| | | | |
|--|---|---|----|
| Introduction | 1 | 2-3. Reporting of emissions volume, etc. as specified by the PRTR Law and actions by the government | 4 |
| 1. The MSDS | 2 | 2-4. Volumes of release and transfer | 4 |
| 1-1. History of MSDS | 2 | 2-5. Flow Chart for Determining Reporting Criteria | 5 |
| 1-2. Major modifications in the revised guidelines | 2 | 2-6. Calculation method | 5 |
| 1-3. The three major laws related to the MSDS | 3 | 2-7. Examples | 5 |
| 2. The PRTR Law | 3 | 3. Industrial Safety and Health Law | 8 |
| 2-1. The aim of the PRTR Law | 3 | 4. Poisonous and Deleterious Substances Control Law | 8 |
| 2-2. Classifications and pertinent standards of chemical substances targeted by the PRTR Law | 3 | 5. Events of the past year | 9 |
| | | 6. Conclusion | 10 |

1. The MSDS

1-1. History of MSDS

As most of you already know, MSDS stands for Material Safety Data Sheet. Some countries have passed MSDS legislation more than five years ago. Following is the history that MSDS was legislated in Japan.

Table 1: History of MSDS legislation

| | |
|-------------|--|
| August 1992 | Establishment of the "Guidelines for MSDS Documentation" (launch of MSDS as an administrative directive) |
| Feb. 2000 | Establishment of JIS Z 7250 |
| Apr. 2000 | Legislation under the Industrial Safety and Health Law |
| Apr. 2001 | Legislation under the Law of Pollutant Release and Transfer Register (PRTR Law) and the Poisonous and Deleterious Substances Control Law |
| Oct. 2001 | Publication of the revised edition of the documentation guidelines |

Under the auspices of three ministries, the Ministry of Health and Welfare, the Ministry of International Trade and Industry, and the Ministry of Labour, the Japan Chemical Industry Association (JCIA) formulated the "Guidelines for MSDS Documentation," which characterized MSDS documentation as an administrative directive, not as legislation.

Later, with the constitution of JIS Z 7250 (2000 edition: MSDS for chemical products - Part 1: Content and order of sections), MSDS documentation became law under the Industrial Safety and Health Law, the Law of Pollutant Release and Transfer Register (PRTR Law), and the Poisonous and Deleterious Substances Control Law.

The current revision was also made under the three ministries mentioned above, and businesses in the chemical industry are expected to follow these revised guidelines in their MSDS preparations.

The following government offices of the three ministries were involved.

Chemical Substance Safety Office of the Evaluation and Licensing Division of the Pharmaceutical and Food Safety Bureau of the Ministry of Health, Labour and Welfare

Chemical Risk Assessment Office of the Industrial Safety and Health Dept. of the Labour Standards Bureau of the Ministry of Health, Labour and Welfare

Chemical Management Policy Division of the Manufacturing Industries Bureau of the Ministry of Economy, Trade and Industry

Environmental Health and Safety Division of the Environmental Health Department of the Ministry of the Environment

1-2. Major modifications in the revised guidelines

The revised guidelines have articulated that MSDS shall be prepared in accordance with the PRTR Law, the Industrial Safety and Health Law, the Poisonous and Deleterious Substances Control Law, and JIS Z 7250, as well as with the 1992 guidelines concerning information disclosure. The previous format will remain valid to the end of Dec. 2004.

For details, refer to the "Oct. 2001 Guidelines for MSDS Documentation (revised edition)" issued by the Japanese Standards Association. Here, several major revised points will be described.

(1) In JIS Z 7250, the items were classified into the following categories.

Requisite items to be filled in

Items to be filled in if information is available

Items to be filled in if relevant

(2) Methods for describing items concerning confidential business information have been defined and clarified.

(3) New items, such as the most significant hazard and summary of potential emergency situations, have been added.

More minor modifications include the following:

- Change to the item (section) under which the UN (United Nations) number is given
- Horizontal lines (ruled lines) formerly placed between items are now omitted to facilitate conversion into electronic data files.
- Only the 16 major item headings will be numbered, and numberings for minor items will not be permitted.
- The "product name," "company name," "registration no.," "date," and "page/total page" shall be entered on each page.

* Though not a modification, the minor item "classification name" is still included, and the relevant requirements and classification name are written as "classification according to Japanese criteria."

This is because the MSD must comply with the notification by the Ministry of Labour entitled "Guidelines Concerning the Labeling of Hazardous Identification, etc. of Chemical Substances (July 1, 1992)," and notification by the Ministry of Health and Welfare and the Ministry of International Trade and Industry entitled "Guidelines Concerning the Safety of Chemical Substances (March 26, 1993)," which remain currently in effect.

1-3. The three major laws related to the MSDS

As shown in the diagram below, a total of over 1,000 chemical substances are targeted by three laws, which are the PRTR Law, the Industrial Safety and Health Law, and the Poisonous and Deleterious Substances Control Law. The total may vary depending on how substances are counted, since, for example, an entire group of metal compounds is counted as a single substance and isomers are not treated separately under the Industrial Safety and Health Law.

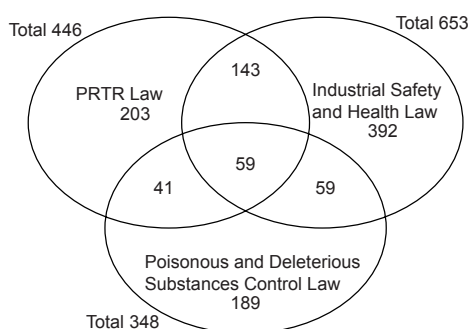


Figure 1: Designated chemical substances for the MSDS ¹⁾

The substances designated in these laws can be easily searched in the "List of Designated Chemical Substances for MSDS Reporting in Japan for the Industrial Safety and Health Law, the PRTR Law, and the Poisonous and Deleterious Substances Control Law" compiled by the Japan Chemical Industry Ecology-Toxicology & Information Center (JETOC). The list is also available in Excel format to facilitate search using the CAS No. (registration number within the Chemical Abstracts Service, in which a single number corresponds to a single substance). The list can be found at <http://www.jetoc.or.jp>.

2. The PRTR Law

The PRTR Law (Law of Pollutant Release and Transfer Register) is officially designated as the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management," and is referred to as the "Chemical Substance Management Law" for short.

Unlike past environmental pollution accidents with only localized effects, environmental pollution currently occurs on a global scale, as seen in the current damage to the ozone layers, and actions taken after the discovery of current effects are often too late. Thus, legislative actions are now being implemented as preventive measures. Though the PRTR Law represents a recent development in Japan, the concept was introduced more than five years ago in the U.S. as the Toxic Release Inventory (TRI) program, and has since then been

implemented in the Netherlands, Canada, Britain, and Australia.

Until now, efforts had focused on preventing pollution by regulating emission standards by law and requiring businesses to comply. The goal has now moved a step higher, to the promotion of management of chemical substances by businesses themselves. This is intended to heighten the environmental awareness of these businesses, and in turn to lead to voluntary measures to control the chemical substances they use (while of course also remaining in compliance with applicable laws).

With this background established, let us move on to a discussion of the actual PRTR Law.

2-1. The aim of the PRTR Law

The aim of this law is to promote voluntary efforts, by these businesses that handle chemical substances, to improve their methods of chemical management, ultimately preventing damaging environmental occurrences, by grasping quantity of various poisonous chemicals released into the environment.

2-2. Classifications and pertinent standards of chemical substances targeted by the PRTR Law

Chemical substances that are potentially hazardous to human health and the ecosystem are listed as Class I Designated Chemical Substances (354 substances) and Class II Designated Chemical Substances (81 substances). Hereafter, these will be referred to as Class I and Class II substances. In some cases, the difference between Class I and Class II substances has been misunderstood as a difference in the degree of harmfulness. In fact, it is grouped by whether the substance exists in the environment or not, and by the difference in estimated exposure, if exists.

Businesses that supply products containing a Class I substance in proportions of 1% or greater (0.1% or greater for Specified Class I substances with known carcinogenic properties) must submit an MSDS showing the concentration (with two significant digits). Furthermore, as explained in the "Flow Chart for Determining Reporting Criteria," companies that operate any of the designated businesses, have 21 or more regular employees, use any of the designated products, and have annual handling quantity of one ton or more (five tons or more for the initial two years, 0.5 tons or more for Specified Class I substances) is required to report on the volume of release and transfer.

Companies that supply products containing a Class II substance in proportions of 1% or greater must also submit an MSDS showing the concentration (with two significant digits). For Class II substances, the companies are not obliged to report on the volume of release or transfer.

How PRTR Proceeds

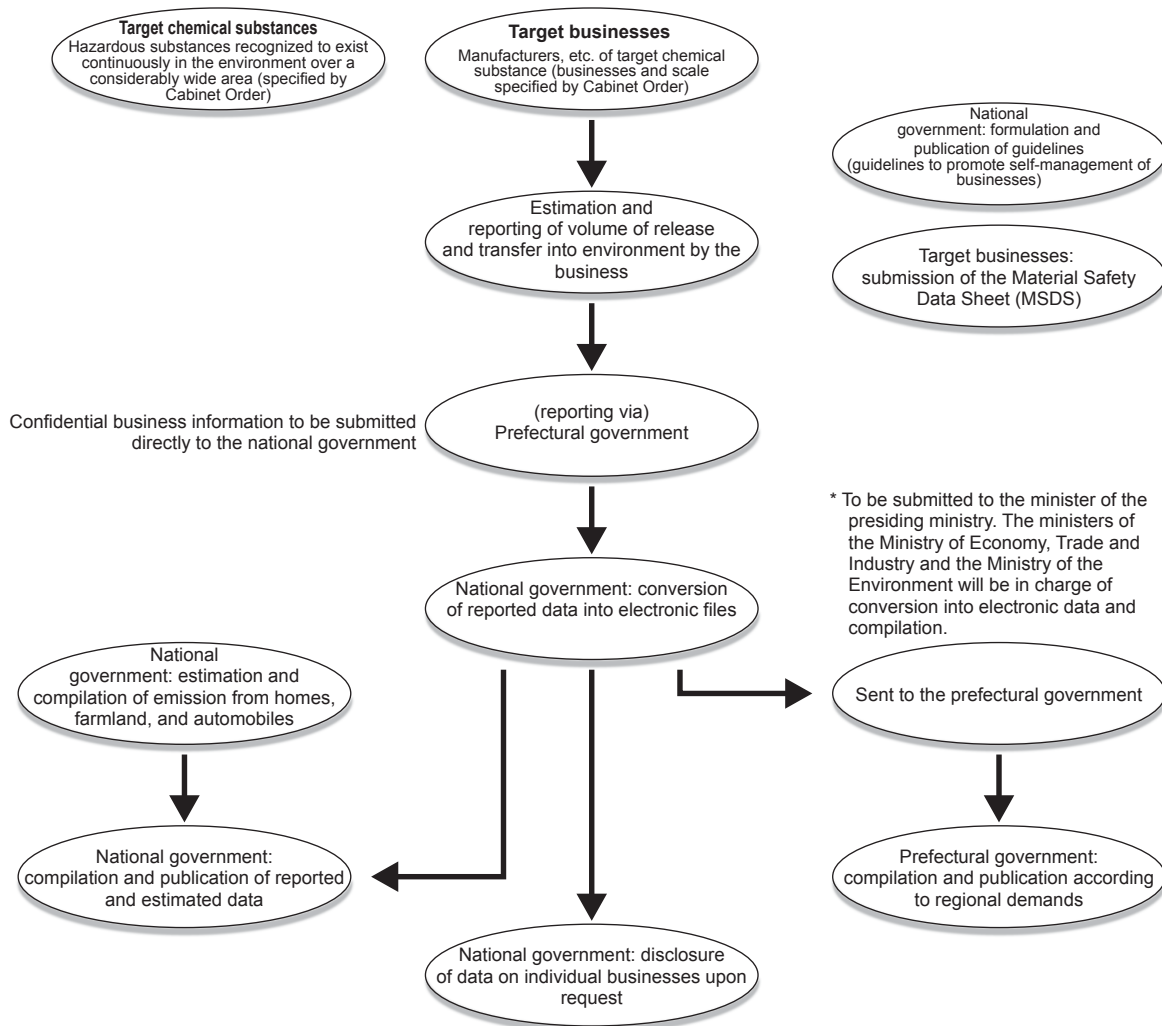


Figure 2: Outline of the PRTR Law ²⁾

2-3. Reporting of emissions volume, etc. as specified by the PRTR Law and actions by the government

(1) Reporting obligation

The relevant business must calculate the volume of release and transfer as waste products into the environment of the designated chemical substance for individual facilities and report the data to the national government via the prefectural government.

(2) Actions by the government

The national government will compile the data according to substance, category of business, and region. The government shall disclose the information submitted by individual businesses upon request.

The details on methods of submission are omitted here due to limitations of space.

2-4. Volumes of release and transfer

Since there may be some confusion regarding the release and transfer of chemical substances, a brief summary will be given here.

Release refers to the following four processes:

- a) Release into the atmosphere
- b) Discharge into public waters
- c) Release into soil
- d) Bury in landfill

Transfer refers to the following two processes:

- a) transfer of wastewater into sewage
- b) removal as waste products from premises

* Chemical substances that are discharged into sewage and released into the rivers via wastewater treatment facilities are to be included in the transferred volume, and those that are discharged directly into the rivers without treatment should be included in the released volume.

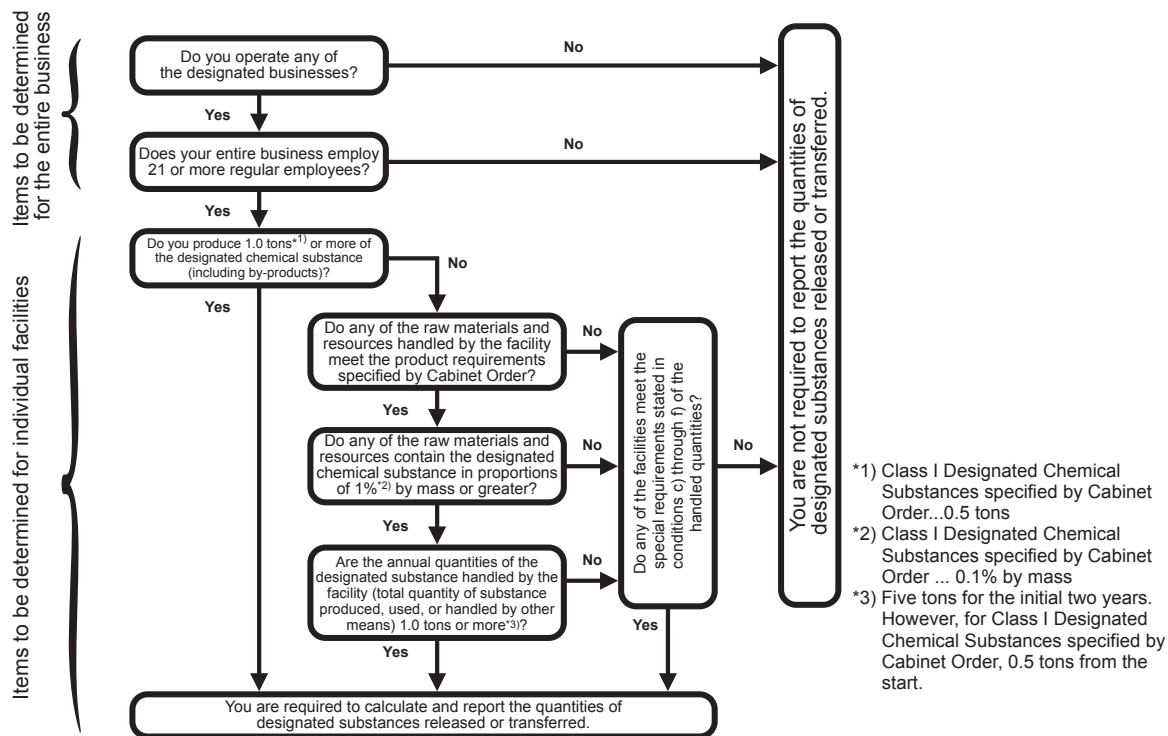


Figure 3: Flow Chart for Determining Reporting Criteria²⁾

2-5. Flow Chart for Determining Reporting Criteria

Potentially confusing elements of the flow chart will be explained here.

If the total number of regular employees for the entire company is 21 or more, the business falls under the category of a designated business. Part-time employees are counted as regular employees if their period of employment exceeds two months.

The "product requirements specified by Cabinet Order" in the flow chart refers to those products that contain Class I substances in proportions of 1% or greater (0.1% or greater in the case of Specified Class I substances), and to which none of the following conditions apply. The conditions are summarized briefly here; refer to the text of the Cabinet Order for details.

- a) A product that keeps a form of solid during handling and does not take a form of powder or granular (example: metal sheets, tubes, etc.)
- b) A products in which the Class I substance remains sealed during handling (dry-cell batteries, etc.)
- c) Products supplied mainly for use in consumer life (household cleaners, insecticides)
- d) Recyclable resources (metal scraps, waste cans, etc.)

* Some of these conditions may not apply to certain products even if these products are solid.

Eyeglass lenses represent one such product, since powdered material is produced when these are grinded in order to insert into the frame.

2-6. Calculation method

There are four basic calculation methods.

- (1) Mass balance calculation
- (2) Calculation based on actual measurements
- (3) Calculation using emission factors
- (4) Calculation using values of physical properties

In addition to these methods, you may also use empirical values which are thought to result more precise results.

2-7. Examples

Table 2 gives examples of substances contained in commonly available adhesives, though they may not necessarily be contained in our products.

(1) Epoxy adhesives

Some epoxy adhesive compounds contain Bisphenol-A-type epoxy resins (only in liquid form). Not all of the Bisphenol-A-type epoxy resins are designated in the PRTR Law-only those in liquid form with small molecular weights. Solid types with large molecular weights are excluded from the PRTR. Thus, even when a liquid product contains large-molecular weight resins dissolved in low-viscosity dilutants or solvents, it is not applied by the PRTR Law.

Table 2: Actual examples

| Types of adhesives and ingredients | Substances designated in PRTR | | |
|---|--|-------------------|------------|
| | Chemical name, generic name | Cabinet Order No. | CAS No. |
| Epoxy adhesives | Bisphenol-A-type epoxy resin (liquid) | I - 30 | 25068-38-6 |
| | 3-(3,4-dichlorophenyl)-1,1-dimethylurea (DCMU) | I - 129 | 330-54-1 |
| Precoat adhesives (epoxy type) | Bisphenol-A-type epoxy resin (liquid) | I - 30 | 25068-38-6 |
| Acrylic adhesives | Acrylic acid | I - 3 | 79-10-7 |
| | Methacrylic acid | I - 314 | 79-41-4 |
| Silicone adhesives | Silicone, the main constituent, is not a designated chemical substance. (However, some products use toluene, etc. to dissolve the catalytic agent, and thus are categorized as designated products.) | - | - |
| Conductive adhesives | Silver powder | I - 64 | 7440-22-4 |
| | Nickel powder | I - 231 | 7440-02-0 |
| Solvent based adhesives and cleaning solvents | Toluene | I - 227 | 108-88-3 |
| | Xylenes | I - 63 | 1330-20-7 |
| | Dichloromethane | I - 145 | 75-09-2 |
| | Trichloroethylene | I - 211 | 79-01-6 |
| | Tetrachloroethylene | I - 200 | 127-18-4 |
| Seizure-preventive lubricant | Molybdenum disulfide (molybdenum compounds) | I - 346 | 1317-33-5 |
| Industrial-use cleaners | Nonyl phenol | I - 242 | 25154-52-3 |
| | Poly(oxyethylene) alkyl ether (alkyl C=12-15) | I - 307 | - |
| | Poly(oxyethylene) octylphenyl ether | I - 308 | 9036-19-5 |
| | Poly(oxyethylene) nonylphenyl ether | I - 309 | 9016-45-9 |
| Inorganic filler | Asbestos | I - 26 | 1332-21-4 |
| Colorants | Cadmium compounds | I - 60 | - |
| | Hexavalent chromium compounds | I - 69 | - |
| Plasticizers | bis (2-Ethylexyl) Phthalate (DEHP, DOP) | I - 272 | 117-81-7 |
| | Di-n-Butyl Phthalate (DBP) | I - 270 | 84-74-2 |
| Anti-freeze | Ethylene glycol | I - 43 | 107-21-1 |
| Rubber solvent | Benzene (impurity) | I - 299 | 71-43-2 |

* In the column for Cabinet Order No., "I" indicates that the substance is a Class I Designated Chemical Substance, and the number represents the Cabinet Order number.

Of the Three Bond products, the following product is not included among the targeted products.

ThreeBond 2001, which is the primary agent of two-part epoxy-compound resin adhesives, is a liquid. However, the Bisphenol-A-type epoxy resin contained in the compound is not in liquid form, and does not fall under the category of designated substances in the PRTR Law. Thus, ThreeBond 2001 is not subject to the PRTR Law.

(2) Precoat adhesives (epoxy type)

Three Bond's encapsulates adhesives into microcapsules and processes bolts with coating the adhesives. Microcapsules are broken and the adhesives are released to react and cure, when the bolt is tightened. This receives a favorable evaluation on the advantages as it prevents

dispersion in coating volumes in the assembly fields, and also keeps the workplace in clean.

For some of the products, the microcapsules contain compounds of Bisphenol-A-type epoxy resin. Bolts coated using such microcapsules do not correspond to solids as defined and excluded by the PRTR Law, and these bolts are thus subject in principle to the PRTR Law. However, the results of calculation of concentrations of the resin in the bolts exclude these products from the PRTR Law.

The concentration is calculated by dividing the mass of the Bisphenol-A-type epoxy resin by the total mass of the coated bolt; in this case the result is less than 1% (less than 0.1% in most cases); no reporting obligations thus arise.

(3) Acrylic adhesives

Acrylic acid and methacrylic acid are sometimes added to anaerobic sealants and ultraviolet-curing adhesives, which are types of acrylic adhesives. The two substances are significantly toxic, as shown by the fact that products containing acrylic acid or methacrylic acid in concentrations exceeding 10% and 25%, respectively, are treated as deleterious substances under the Poisonous and Deleterious Substances Control Law. There are products on the market having high concentrations of acrylic acid and methacrylic acid, but Three Bond is currently directing its laboratory staff to refrain from including the two substances in mixtures of products currently being developed.

(4) Silicone adhesives

The main constituent, silicone, is not a designated substance in the PRTR Law. However, toluene and other solvents added to dissolve the catalytic agent may fall under the category of designated substances, and the product may become subject to the PRTR Law depending on concentration.

(5) Cleaners

Nonylphenol is a designated substance under the PRTR Law. However, note that although a product may not contain nonylphenol itself, it may contain a substance that will decompose immediately after release into the environment to produce nonylphenol.

(6) Colorants

Some pigments contain cadmium, such as cadmium yellow and cadmium red. Cadmium is a Specified Class I substance, and products that contain cadmium in proportions of 0.1% or greater are subject to the PRTR Law.

- ◎ Products that will be regarded as designated substances when calculating annually handled quantity
When calculating annually handled quantity, the total volume is determined for the (Specified) Class I Designated Chemical Substance contained in the products (handled raw materials and resources), with a circle placed to the right of the product names, handled at the business facility.

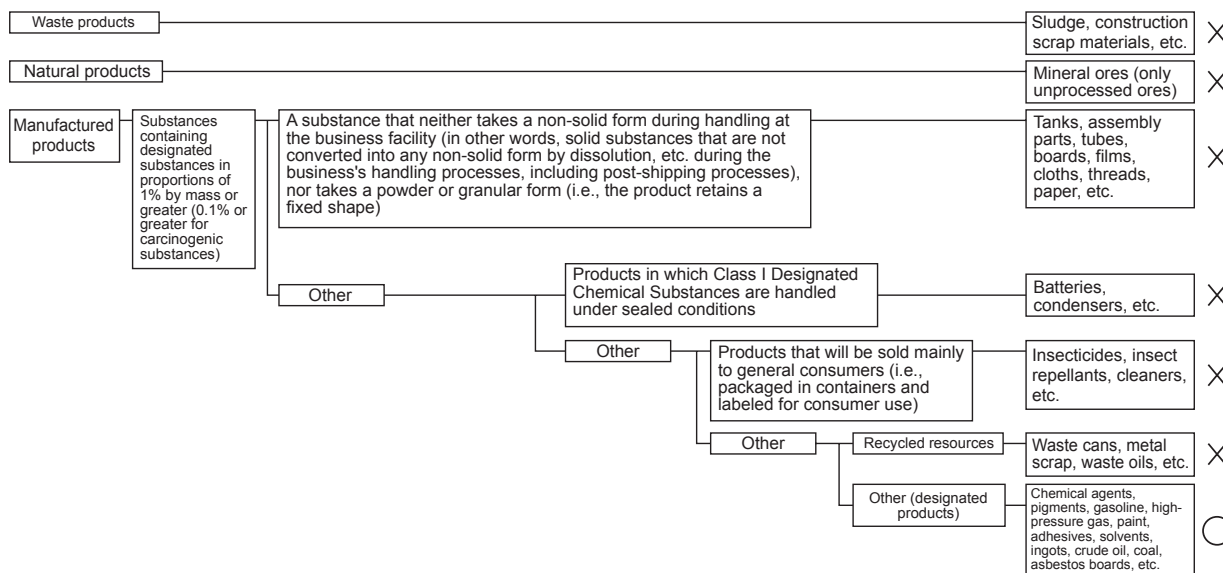


Figure 4: Forms of products (handled raw materials and resources) regarded as designated substances²⁾

(7) Inorganic fillers

Some epoxy resin adhesives contain asbestos (chrysotile). Additives mixed to prevent sagging of adhesives are referred to as "thixotropic agents." Asbestos was commonly used in the past due to its superior properties as a thixotropic agent and to its low cost.

Three Bond acquired ISO 14001 certification in Jan. 2001 and is now aggressively promoting the reduction of environmentally hazardous materials in our products. The development of asbestos-free products is an important part of this endeavor. Taking this opportunity, Three Bond would ask our customers to consider using available asbestos-free alternatives.

Zinc oxides are included among other inorganic fillers added to adhesives, but these compounds are not designated substances under the PRTR Law. This is because zinc compounds included in the list of designated substances of the PRTR Law are restricted to water-soluble compounds, and zinc oxides are insoluble in water.

Benzene is another common additive, and is a Specified Class I Designated Chemical Substance. It is contained in gasoline in proportions of 0.1% or greater, and may also be used in rubber solvents, etc. as dilution solvents.

Hexavalent chromium is also categorized as a

Specified Class I Designated Chemical Substance. Care must be taken when handling some types of paint or the like as these substances may contain hexavalent chromium as a rust inhibiting pigment.

In particular, the reporting criteria for Specified Class I Designated Chemical Substance concentration is 0.1%, an extremely low value, so special care must be taken when handling products containing Specified Class I substances.

"Solubility" is defined as the "ability to dissolve in water of neutral pH at a proportion of 1% by mass or greater at ambient temperature."

Although it may be somewhat unrelated to the topic of this section, it is worth mentioning Bisphenol-A. In animal testing, it has been shown that Bisphenol-A weakly imitates a certain female hormone. However, the actual extent of its effect on the ecosystem is still under discussion.

I have noticed that some people confuse the Bisphenol-A-type epoxy resin contained in our epoxy adhesive products with Bisphenol-A. It should be stressed that Bisphenol-A is not an intentional residue in Bisphenol-A-type epoxy resin adhesives, and the residue amounts are significantly trace (1 ppm or less in the Bisphenol-A-type epoxy resin handled by our company).

3. Industrial Safety and Health Law

The following two points in the MSDS regulations are based on the Industrial Safety and Health Law.

- (1) Obligations of the seller or supplier of products containing "substances subjected to notification" to disclose information through MSDS, etc., and re-notification obligations after any modifications
- (2) Obligations of businesses handling such products to disseminate information on MSDS to workers

Chemical substances subject to MSDS regulations include the seven chemical substances requiring manufacturing permits according to the Industrial Safety and Health Law, as well as the 631 substances specified by Cabinet Order and their associated compounds. These 631 substances have been specified based on the recommendations on allowable limits given by the Japan Society for Occupational Health and on the TLV (Threshold Limit Value) data presented by the American Conference of Governmental Industrial Hygienists (ACGIH).

Examples of products that will be exempt from the MSDS regulations include the following.

- Products containing substances subject to notification in concentrations less than 1%
- Products supplied mainly to general consumers, such as:
 - a) Pharmaceutical, quasi-drug, and cosmetic products specified in the Pharmaceutical Affairs Law
 - b) Agrochemicals specified in the Agricultural Chemicals Regulation Law
 - c) Products that remain in solid form at all times during the handling of the product by the worker and that take neither powder nor granular form.
 - d) Products in which the substance subject to notification remains sealed
- Waste products

Information should generally be provided in paper or magnetic disc (floppy disk) form. However, if the receiving party approves, it may be provided through fax, electronic mail, or publication on the Internet.

The term "water soluble" in the present Law refers to the state in which less than 100 milliliters of water is required to dissolve 1 gram of the substance in question.

The term "urethane," substance #61 in the list of substances subject to notification, refers to "carbamic acid ethyl," and so the "urethane" of our urethane adhesives does not fall under this category.

When substances subject to notification for which isomers exist are listed simply as "propyl alcohol" and "hexane," then both the normal and branching isomers should be regarded as specified substances. In contrast to the PRTR Law, in which the quantities of metal compounds are converted into quantities of elementary metal, the quantity of metal compounds of substances subject to notification under the Industrial Safety and Health Law are

expressed as the total quantity of the compound. Thus, this results in the inconvenient requirement to include both quantities (total and converted values) in the MSDS.

How high a concentration of a substance triggers the MSDS documentation obligation? The criteria in the PRTR Law were 1% for Class I substances and 0.1% for Specified Class I substances. Under the Industrial Safety and Health Law, the obligation for notification arises when the substance is contained in concentrations of 1% or greater.

Furthermore, according to the Industrial Safety and Health Law, the concentration of the substance should be represented with accuracy of $\pm 5\%$, and not in terms of two significant digits as in the PRTR Law.

4. Poisonous and Deleterious Substances Control Law

MSDS regulations were also made compulsory in the Poisonous and Deleterious Substances Control Law. The classifications of poisonous and deleterious substances are as follows.

Poisonous substances: toxic substances

Deleterious substances: harmful substances

Specified poisons: substances that are extremely toxic

There are 3 regulatory modes for deleterious substances.

- (1) Regulated by substance name only
Substances consisting of single substances such as toluene, xylene, and methanol
- (2) Regulated by both substance name and concentration
Substances not subject to law unless contained in concentrations exceeding a threshold value
- (3) Regulation of all preparations containing the substance
Regardless of the concentration, all products containing the substance as an intentional additive are subject to law.

Three Bond markets a curing accelerant with methanol concentration of 90% or greater, but it is not categorized as a deleterious substance since it is not a single-substance product. Would a cleaner consisting of 50% toluene and 50% xylene (no such product is in fact marketed by Three Bond), both deleterious substances, be categorized as a deleterious substance? No, it would not. Although it seems illogical that a mixture of two deleterious substances is not considered deleterious, this is how such a product will be treated according to the law. However, the above case only applies to substances regulated by name only (Mode (1) above).

The adhesive power of some acrylic adhesives is enhanced by the addition of acrylic acid or methacrylic acid. In such cases, concentrations of acryl acid exceeding 10% or methacrylic acid exceeding 25% will be subject to this law. Adhesives containing these additives in lower concentrations are regarded as ordinary products.

Three Bond markets products containing these additives, but all have concentrations of less than several percent, and thus do not fall under the category of deleterious substances.

Although "cyanide compounds" are listed as deleterious substances, instant adhesives are not subject to this law since they are included among "cyanoacrylic acid esters and preparations containing them," which are exempt from this law. Dicyandiamide, which is sometimes used as a curing agent for one-part epoxy resin, is also included among "dicyandiamide and preparations containing it," and is therefore also exempt from this law.

According to the MSDS regulations based on the Poisonous and Deleterious Substances Control Law, products that are mixtures of deleterious substances such as toluene, xylene, and methanol are not regarded as deleterious products. As stated above, this is because only pure (single-substance) products are considered deleterious; mixtures are exempt.

However, the above case is true only under the Poisonous and Deleterious Substances Control Law. Under the PRTR Law and the Industrial Safety and Health Law, all products containing toluene or xylene in concentrations of 1% or greater are subject to MSDS regulations. Methanol is categorized as a designated substance under the Industrial Safety and Health Law, and so submission of the MSDS becomes compulsory.

5. Events of the past year

The most important topic for the author in terms of chemical management is the implementation of the PRTR Law; in terms of preparation of the MSDS, the most important concern is probably the issuance of the revised guidelines for MSDS documentation.

However, a number of additional important developments merit discussion here.

◎ Modifications to the Fire Service Law

The following changes were made to the Fire Service Law, with these changes to become effective on June 1, 2002.

- Setting of upper limit to the ignition point for Category-4 petrochemicals of Class-4 hazardous materials

Category-4 petrochemicals of the Class-4 hazardous materials under the Fire Service Law are defined as liquids having ignition points of 200°C or above. Previously, no upper limit had been set for the ignition point, but now the ignition point range is defined as 200°C or above and below 250°C. Under the Fire Service Law, liquids having ignition points of 250°C or above are not classified as hazardous materials, but as flammable liquids of the designated flammable substances.

Three Bond has several Category-4 petrochemical products with ignition points of 250°C or above. Thus, these products will now be classified as flammable liquids of designated flammable substances. However, since the change will not be effective until June of this year (2002), changes to labels and the like cannot be made before then, as this would be in violation of the law. Until the date

of enforcement, these products will be labeled under the present classification (Category-4 petrochemicals) with an appended note indicating that they are to be classified as flammable liquids of designated flammable substances after June 1, 2002.

- Change to the lower limit of the ignition points for high ignition point hazardous materials

The lower limit of high ignition point hazardous materials has been changed from 130°C to 1,000°C.

- Hydroxylamine has been designated as a Class-5 hazardous material

Hydroxylamine and their salts, which became focus of interest after an explosion and fire at a hydroxylamine-manufacturing factory in 2000, have now been designated as Class-5 hazardous materials. These substances are not used in any of our products. Instructions on handling hydroxylamine have also been appended to the Ordinance on Labor Safety and Hygiene as of Nov. 16, 2001.

◎ Laws relating to waste product treatment and cleaning

- Confirmation of final disposal site

In many cases, industrial waste products are incinerated. When the incineration is commissioned to outside businesses, the business that has discharged the waste product is obligated to confirm not only the appropriateness of the incineration facility (intermediate processing facility) but must also take steps to assure the proper disposal of ash residues at the landfill (final disposal site). It is best to confirm the final disposal site with one's own eyes, and so at Three Bond, the author has traveled to Hokkaido to confirm the conditions of the controlled landfill site where ash residues are buried. Although it is most important to confirm that the disposal process is being conducted properly, it is also important to keep records so that the act of confirmation may be verified during inspection by authorities and during ISO 14001 investigation. Indeed, when Three Bond was applying for ISO 14001 certification, inspectors asked questions regarding the matter during the investigation. The same questions were asked during an audit with a client company. When visiting the final disposal site, photographs should be taken to include the person confirming the site, and these should be kept as records along with the pamphlets of the relevant disposal site and business cards of those people met at the site.

- Changes to the manifest form

The industrial waste management (manifest) form is now a size larger than before, and includes Form E, corresponding to certification of the final disposal site. Verification of that the disposal of industrial waste has been properly carried out can only be made with a complete set of Forms A, B2, D, and E after final disposal and following confirmation of that the contents of the forms are free of error.

6. Conclusion

This issue has been written as a response to questions asked by our customers and salespersons and researchers in our company regarding the management of chemical substances. In some areas I may have gone into more detail than necessary, while in others I must apologize for any insufficiency in the discussion due to limitations of space. I would ask readers to refer to websites maintained by the relevant agencies and to available specialized literature to make up for these shortcomings.

Three Bond acquired ISO 14001 certification in Jan. 2001, and we believe that our social responsibilities have since increased to a greater extent than ever before.

It seems that some companies take the stance that disclosure of component information of substances, which have not yet caused any problems in Japan, is not necessary. Our company, however, is aggressively expanding business overseas and believes that hazard related information should be provided as thoroughly in Japan as in foreign countries. Even before the establishment of laws to regulate substances with strong toxicity, Three Bond actively disclosed information designed to promote the use of protective gear among our customers in the course of handling hazardous substances. Naturally we are also making vigorous efforts to develop safer alternative products. Three Bond is also considering plans to revise the MSDS for our products according to the new guidelines and to publicize these revisions on our website so that this information will be available to our customers at all times.

It may be said that some people regard chemicals as synonymous with pollution and environmental destruction, but without chemicals our society could not function as it does today. We offer our products with commitment and pride and plan to do all that we can, in order to promote proper handling.

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