

Introduction to HazCom:

How to Get a Handle on
Your Chemical Management



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Congratulations! You've learned that you're responsible for managing Hazard Communication (HazCom) for your company's chemical inventory. That's a huge responsibility, but it's also a great opportunity to improve workplace safety and become an EHS leader.

You might feel overwhelmed. We get it – we've all been there before. It can be difficult to even get your bearings in the world of HazCom, because the Standard itself is difficult to understand in isolation, and guidance materials are scattered. To help you on your HazCom journey, we're providing you with this introduction to HazCom. We hope that it will reduce your anxiety and help you prepare for the start of your HazCom journey.





The Chemicals in Your Workplace

Let's start with the basics. No matter what kind of company you work for and what its primary business activities are, you most likely have chemicals in your workplace. They might be housekeeping chemicals like floor cleaners and paints, maintenance chemicals like oils and lubricants, or process chemicals like acids and solvents used to manufacture a chemical product. You might find these chemical products under the sink in the breakroom, in a drum in a chemical storage cabinet, or on a table in the middle of a workstation.

Chemical products can be dangerous for a number of reasons. Often, they have physical hazards, which are basically hazards inherent in the properties of the chemicals themselves, and those hazards warrant careful attention to their use or storage. They might be flammable, like many common solvents, such as acetone or isopropyl alcohol or explosive, like nitroglycerin. Certain types of chemicals also react strongly with other chemicals, like oxidizers including potassium permanganate, which can react strongly with chemicals such as glycerin — even to the point of producing flames! Another common physical hazard is compressed gas, which exists as a hazard for canisters of fueling propane, and for tanks of welding and blanketing gases, such as acetylene or argon.

Other chemicals have health hazards, because exposure to them can result in acute or chronic health effects. They might be corrosive, like strong acids (hydrochloric acid, sulfuric acid) or bases (sodium hydroxide, potassium hydroxide), which can damage body tissue upon contact. They might be acutely toxic (like arsenic), meaning that a single dose or short-term exposure can result in serious health effects, including death. Other types of chemicals such as many common solvents and cleaning products can cause a range of health symptoms resulting from short- or long-term exposure, including respiratory tract irritation, skin sensitization, narcotic effects, or irritation to the skin and eye. Finally, chemicals that are environmental hazards such as ammonia can adversely affect the health of organisms or humans if they enter aquatic environments, such as rivers and lakes.

It's important to realize that it's not always obvious how to flag the dangerous chemicals in your workplace without detailed hazard information. You can get dangerous chemicals from many sources, not just from major chemical manufacturers or suppliers. For example, if you go to a hardware store, you can usually buy "muriatic acid," which is the trade name for a product containing hydrochloric acid, which happens to be an extremely corrosive acid that is capable of eating through plastics and metals — as well as your own skin and flesh!



Also, dangerous chemicals don't often look any different from other chemicals. In fact, many highly toxic liquid chemicals are clear, and look much like water, and many solid chemicals are white and granular and look much like sugar. Without careful management of these seemingly innocuous substances, they can mistakenly be ingested, resulting in serious injury – even death.

In fact, a mix-up involving some such chemicals occurred at a US restaurant in 2014. A restaurant employee unknowingly added what looked like sweetener from an unlabeled container to a batch of iced tea. The substance was actually lye, a caustic cleaning chemical. This now lye-laced iced tea was then served to a customer who drank it and consequently suffered severe burns to her esophagus and mouth, and very nearly died from her injuries.

The important point here is that you can't protect yourself, your employees, your customers, or other members of the public from the dangerous effects of exposure to these chemicals, unless you have accurate information about their hazards. You also can't effectively plan your emergency response procedures in the event of a spill, explosion, fire or other chemical accident. That's why it's so important to get HazCom right.

Life Before HazCom



We can even better appreciate the importance of HazCom by recalling the time *before* the Standard existed.

Prior to HazCom, many facets of chemical safety fell under the general duty clause of the original Occupational Safety and Health Act, which stated that employers must provide their employees with a place of employment “free from recognized hazards that are causing or are likely to cause death or serious physical harm.” The problem was that employer responsibilities weren't clearly defined, and that even the most well-intentioned employers couldn't adequately protect the safety of their employees if manufacturers didn't provide them with accurate information about chemicals, along with shipments.

Unfortunately, many employees in those days simply didn't know what chemicals they were working with, much less how to safely handle and store them. Because chemical hazards were poorly understood, if at all, employees were also not provided with or trained on proper personal protective equipment. As a result, many suffered or are still suffering long-term health effects, such as debilitating and chronic respiratory illnesses, memory loss, and even fatal diseases such as cancer.

It was dangerous to work industry jobs involving chemicals back then. As OSHA became increasingly aware of the dangers, it saw the need for regulations to help ensure that workers were better informed about the hazards of chemicals they were working with.

What is the HazCom Standard?

OSHA issued the first version of the HazCom Standard back in 1983, although the applicability was limited to the manufacturing industry. OSHA broadened the scope in 1987 to include all industries where employees are exposed to potentially hazardous chemicals, and revised the Standard again in 1994. The Standard, through its updates and revisions, created more detailed and



specific requirements for manufacturers to label the chemical products shipped to downstream users, and for employers to maintain a comprehensive hazard communication program to protect workers.

Still, problems remained. Manufacturers under HazCom 1994 had a great deal of latitude when it came to formatting material safety data sheets (MSDSs) and shipped labels. For example, there was no consensus on what symbols to use for different kinds of hazards, such as toxic chemicals or flammable chemicals. This often caused confusion for downstream users, ultimately compromising safety.

An arguably even bigger problem was that MSDSs lacked a standardized format. You might've found contact information for the manufacturer on page 1 for one document, or page 6 (or on any other page) for another, and the same goes for important information about physical characteristics and emergency response. People generally look for SDSs during emergencies, so they can retrieve critical information that can help guide them toward next best steps for dealing with an exposure or release, and those are exactly the instances when you don't have time to hunt through documents that could be upwards of 15 pages in length to find the information you need. Something had to change.

What is GHS?



In 1992, representatives of international government agencies and other stakeholders convened at the Conference on Environment and Development, held by the United Nations (UN). Attendees discussed the variable quality and formats of hazard communication information within their jurisdictions, and also on the even greater variability in information across jurisdictions. The lack of consistency made it difficult for employers to manage hazard communication for all of their employees, and to efficiently provide access to important chemical information.

After years of development, a subcommittee of the UN published the first version of the [Globally Harmonized System of Classification and Labelling of Chemicals \(GHS\)](#) in 2003. The GHS is a voluntary hazard communication system for classifying hazards and communicating

hazard information, and individual countries or individual agencies within a jurisdiction over hazardous chemicals can choose to adopt GHS by aligning their regulatory framework with its provisions. (For instance, in the US, GHS has been adopted by OSHA, the Department of Transportation, and partially by the EPA). When regulatory entities adopt GHS, hazardous chemical classifications, communication and regulatory requirements across countries continue to become more aligned.

The alignment is not perfect because the UN subcommittee on GHS reviews and updates the standard every 2 years, different countries are aligned with different versions of the GHS at any given time, and they have latitude over which elements they adopt. But still, compared with the large amount of variability in the quality and presentation of hazard information in the past, GHS has brought significant improvement.

Alignment of HazCom with GHS

OSHA was one of the most important stakeholders in the original discussions that led to the development of GHS, so it was no surprise that in 2012, it published a final rule, updating its HazCom Standard to align with Revision 3 of the system.





Several major changes came with the adoption of GHS. Hazardous chemicals are now classified according to very specific criteria with additional clarity and nuance incorporated into the definitions of chemical hazards. Manufacturers also have firm requirements when it comes to how information is communicated on shipped container labels and SDSs. For shipped labels, they must ensure each contains six required elements: product identifier, manufacturer information, and applicable hazard pictograms, signal word (either “danger” or “warning”), hazard statements and precautionary statements. The corresponding product SDSs must be in the GHS-aligned 16-section format as described in this [OSHA Brief](#). It’s not mandatory under HazCom to include the information for Sections

12 through 15, but you must always include the section numbers and headings to maintain the integrity of the documents’ 16-section, strictly ordered format.

When the 2012 final rule was published, a series of phased-in transition deadlines went into effect for compliance that included a final transition deadline for employers of June 2016. But many manufacturers missed their 2015 deadline to reclassify their chemicals and develop new SDSs and shipped labels, which affected everyone downstream in the supply chain. Even now, there’s a chance that some of the documents for chemicals in your workplace are in the old MSDS format. And of course, new chemicals and new SDSs will keep entering your workplace, so you’ll need to be vigilant about keeping your chemical inventory and SDS library up-to-date.

All of this means that while the original transition timeline for OSHA’s first alignment with GHS is now technically over, your responsibilities remain! Additionally, OSHA is currently [as of March 2020] planning a notice of proposed rulemaking (NPRM) to align the HazCom Standard with a more recent edition of the GHS and has expressed intent to continue seeking re-alignment opportunities to continue enhance the safety of the system and keep pace with global best practices.

What Are My Responsibilities?

The answer to that question depends on who you are, and what you do.



Manufacturer/Importer Responsibilities

If you manufacture or import hazardous chemicals, you’re responsible for classifying the hazards of those products. Appendixes A and B of the Standard contain the instructions you need to do this. Based on the classifications, you must then use information from Appendix C of the Standard to determine what hazard information, including signal words and pictograms, to include on your shipped labels, which are to be affixed to all hazardous chemical product containers you ship downstream.

You also need to develop SDSs for all chemical products you manufacture or import. You must provide SDSs to downstream users with initial shipments of chemical products, next shipments after you’ve revised the documents with any new significant information, and when requested by a downstream user.

As a manufacturer or importer, you’re at the top of the supply chain, and everyone downstream depends upon the accuracy of the shipped labels and SDSs you supply. That’s why it’s especially important for you to get it right!





Distributor Responsibilities

The HazCom Standard defines a “distributor” as “a business, other

than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.” Basically, this means that you’re a distributor if you receive chemical products from a primary manufacturer, and then ship them to users downstream.

You’re responsible for including shipped labels and SDSs with the chemicals you ship downstream. That means you should stay on top of the chemical suppliers who ship to you in order to make sure they’re sending you accurate hazard information for the products they supply.



Employer Responsibilities

Employers are the end-users of

chemicals, and have the important responsibility to ensure that their own employees have the information they need about the hazards of chemicals in the workplace. Remember the discussion about the “bad ole days” before there was a HazCom Standard – what a dangerous time it was for workers? OSHA developed employer requirements under the HazCom Standard to help reduce the potential for those situations.

The very beginning of the HazCom standard requires employers to have a “comprehensive HazCom program.” But what does that mean, exactly? **To meet OSHA’s requirements, an employer needs to include these 5 components in their plan:**

1) A Written Hazard Communication Plan. Consider this your “playbook” for managing HazCom at your site. That’s why it’s so important that your plan is site-specific. Resist the temptation to just download any old template from the internet and put your company’s name and address on it. You need to lay out the details of your chemical hazards, your storage practices, your workplace labeling system (more on that later!) and your training program. You also need to make sure this program is accessible to all of your employees, and that they know where to find it. Don’t worry, we’ll spend plenty of time talking more about the Written Plan later!

2) Chemical Inventory List. Just like the name implies, this is a list of all of the chemical products in your workplace for which you are required to maintain SDSs. You can probably see the reason why this is a required element — you can’t communicate the hazards of chemicals in the workplace to your employees if you don’t know what chemicals you have. As you bring new chemicals into the workplace, make sure

that the chemical inventory list is kept up to date. For more information on how to structure your chemical inventory list, see our section on the Written Hazard Communication Plan.

3) Proper Labels and Warnings. Employers must ensure that shipped labels on incoming containers are not removed or defaced. But there are plenty of containers in the workplace other than the initial shipped containers — including transfer buckets, spray bottles, drip pans beneath equipment, and reservoirs for hydraulic oil and coolant within machines — that require labels as well! What you for labeling chemicals in your workplace is referred to as your workplace labeling or secondary container labeling system. We’ll talk more about labelling requirements later.

4) SDSs and Right-to-Know Access. The whole purpose of the HazCom Standard is to protect workers who are exposed to hazardous chemicals. It shouldn’t be a surprise that one of the most central responsibilities of an employer is to ensure their workforce can access the SDSs for hazardous chemicals they work with during their workshifts. The key is that they must have access to the exact documents for the exact chemicals they work with, which means you have to maintain the SDS for the chemicals provided by the manufacturer, rather than a “generic” SDS.



You also can't have any barriers to access. For example, if you keep your SDS library in a binder in a supervisor's office, and that supervisor then goes to lunch and locks her office door, employees would not be able to obtain the SDSs in that binder in the event of an emergency. A cloud-based SDS management system can help by providing the 24/7 access you and your workforce need and are required to have. [Emergency Response Services](#) from VelocityEHS can give you additional help, including exposure support in the event of a chemical release, and access to our 24/7 Emergency Response Communication Call Center.

Of course, none of the efforts you make to manage HazCom will bear fruit if your employees don't understand the Standard, or the specific details of your HazCom program. That means you'll need to train them, and more importantly, you'll need to verify that they've understood their training.

OK, Good to Know. But Where Do I Start?

Everything starts with knowing what chemicals you have in the workplace. Make sure your chemical inventory is up to date, and doesn't have any gaps due to chemical products that may have "snuck in" one way or another! Having

good communication with your department supervisors and an active inspection program will definitely help with this.

That leads us to our next topic: the steps you can start taking today to improve management of HazCom at your workplace. Not surprisingly, it all starts with getting communications set up with the right people.

Five Steps to HazCom Compliance



Build Your Team

You don't usually find this listed as the preliminary step before putting together a HazCom program. That's why the HazCom programs of many companies so often fail.

Think about it, though — managing HazCom is a big task, and you can't do it all by yourself. You're going to need to collaborate with people who know what chemicals are at your facility, and who can tell you when new chemicals arrive. Even better, you'll want to know if plant personnel are considering new chemicals before they buy them so you can review the necessary hazards and safety precautions, and decide whether to allow the chemical into your workplace.

Some of the key players you'll want on your team include:

Purchasing Managers

Good communication with your Purchasing Department provides a great primary line of defense in the HazCom management game. Work with your Purchasing Department reps to make sure there is a clear procurement policy in place so that any planned orders for new chemicals go through a comprehensive review and approval process first.

Of course, not every chemical arrives through a formal purchasing process, so a procurement policy won't solve all of your problems – but it's certainly a good start!



Maintenance Supervisor/ Facilities Manager

Individuals who hold this position will have a good sense of what chemicals are used and stored throughout your facility, because the nature of their work familiarizes them with all work areas and equipment. Because they're not a formal part of production processes, they may very well notice containers of chemicals that have just become invisible parts of the workplace background to supervisors and employees who work in these areas every day.

They'll also be able to tell you a great deal about the specific chemicals used in maintenance activities, which is great, because those are the types of chemicals that frequently fly under the radar.

Department Supervisors

You'll find that department supervisors are great partners in HazCom management. They're dialed in to plans to bring new chemicals into the facility, and know all the ways chemicals are used and stored. They're also more likely to know when employees buy chemicals over-the-counter from industrial supply stores — a situation that often leads to chemical products to “sneaking in” without formal review or approval.

Establish good relationships with all supervisors. Ask if you can stop by their department safety meetings to speak to their workers about HazCom. As you develop relationships with them, you'll probably find that they appreciate your involvement and will seek you out to provide you with updates on new information or ask for your input, which will be a great help to your management program.

Employee Safety Team

Your HazCom management success depends on the active involvement of your workforce, and their buy-in to your EHS culture. No one is better positioned to understand everyday issues involving chemical safety than your workers, because no one is as familiar with the detailed aspects of their jobs as they are.

Safety committees or teams are, therefore, an excellent resource for you as you begin structuring your HazCom management program. Deputize your team to perform chemical inspections, model good HazCom awareness, and bring you information that can help you keep your chemical inventory and management program accurate and up-to-date.

Upper Management

On paper, many organizations involve upper management in their HazCom program. After all, look at most Written HazCom Plans, and you'll see the names and signatures of really important people right there. But in my experience, most of those people weren't actually involved in the development of management programs, and may not even be familiar with the contents of the plans.

Some may prefer that situation, appreciating that the C-suite trusts them to get things done right without feeling the need to get into the weeds themselves. The only problem with that approach is you're unlikely to do things right without some involvement from top management.

There are a few reasons for this, but perhaps the biggest one is that when executives demonstrate active knowledge of your HazCom practices, they are communicating to everyone they encounter that HazCom matters. Conversely, when employees perceive that upper management doesn't care much or talk much about HazCom, they conclude that it's not so important after all.

Of course, it can be difficult to get a significant commitment from the executive wing, and you'll need to respect their time. But I think you'll find that if you ask for at least some input from them in developing your program, they'll take more ownership of it and advocate for its success.



Understand Your Inventory

I hope it's immediately obvious why this is such an important step. You can't manage HazCom if you don't know what chemicals you have in the workplace, but knowing what you have isn't as easy as it may seem. During my time in consulting, I rarely encountered facilities where there were not at least some "surprise" chemicals lurking somewhere, and some were quite dangerous and required several regulatory considerations.

As mentioned earlier, a good relationship with Purchasing and a sound procurement policy will head off many potential problems here. You'll be able to identify hazards, and proper handling and storage considerations before the chemicals even cross your threshold, and you'll be able to plan accordingly.

Of course, it's not just knowing what you have that matters — it's also understanding the specific hazards and regulatory considerations required to properly manage the chemicals.

We'll talk more about how to improve the way you put your HazCom information to work for you later in this guide.

Harmonize Your HazCom Program

Once you have a good understanding of the chemicals in your inventory, you can proceed to the next step, which is to harmonize your management of that inventory and its chemical hazards. This is where you'll make sure you have an SDS for every chemical in your inventory, and request any missing documents from your chemical suppliers. You may need to request new documents from the supplier if you only have old-format material safety data sheets (MSDSs) instead of the 16-section SDS format required under OSHA's HazCom 2012 Standard. You may also need to request new documents if you have reason to think that the documents you have are not the most recent versions.

Keep in mind that you shouldn't use a single SDS for a chemical product to stand in for individual SDSs from every manufacturer who supplies it to you. OSHA addressed this issue in a 2015 directive, which stated "if the employer is maintaining one SDS for a particular chemical but uses that chemical from a different manufacturer or importer without obtaining/maintaining the SDS from the new manufacturer or importer, the employer is not compliant."

This might seem like a burden at first. But in reality, it's the only way to really be sure you have accurate hazard information for all of your chemicals. If you've ever dealt with strong acids like sulfuric acid, you know that there's a big difference between a concentrated or highly diluted solution, and it can make the difference between skin irritation and a severe burn that causes permanent tissue damage. The only way to remove the ambiguity around whether you're dealing with the same chemical at the same concentration, with the same hazards, is to have an SDS for every chemical purchased from every supplier.

The product identifier is one of the keys to effective HazCom management. Make sure it matches for each chemical across your chemical inventory list, your SDS library, the shipped container labels, and any secondary container (aka "workplace") labels. This will help avoid confusing scenarios, such as one I've encountered in which a "nickname" like "Solvent A" is used for a chemical on secondary container labels in lieu of the product identifier listed on the shipped container label and SDS. This creates ambiguity in the minds of employees seeking the SDS for that chemical, and ambiguity is one of the last things you want to deal with when it comes to chemical safety.



Plan, and Then Fix the Plan!

You're going to need a Written HazCom Plan. Notice that this isn't necessarily the first step you should take when trying to master your HazCom obligations, because in my experience, you are unlikely to be able to write an even halfway decent plan unless you've already built a good management team, familiarized yourself with your chemical inventory, and taken steps to harmonize your overall HazCom program, as discussed above.



We'll talk more about the nuances of managing your Written HazCom Plan later. For now, the key takeaway is that it's okay if your plan isn't perfect at first. The key in the beginning is to just go through the exercise of trying to accurately describe your HazCom management practices. Get it all down in a draft document, and then refine it later.

The fact is, your Written HazCom Plan will always be a work in progress in some sense, because you'll need to update it each time you make a major change to your program, such as by introducing a new kind of hazard (bringing a chemical into your workplace for the first time) or changing details about your workplace labeling system.

Fix Your SDS Access

Remember when we talked earlier about the "bad old days" when workers quite often had little available information regarding the chemicals they worked with, and the workplace was a dangerous place to be. One of the main ways OSHA sought to address that was by requiring manufacturers to develop SDSs and to provide them to downstream users. Employers must then maintain the SDSs received from suppliers, and provide their employees with "right to know" access to their SDS library.

If you are a chemical manufacturer, remember that you must provide SDSs to downstream users with initial shipments of chemicals, with next shipments following new significant updates to the documents, and when requested by downstream users.

If you're an employer/end user, remember that your SDSs must be available to workers during their workshifts, with no barriers to access. Some well-intentioned individuals place binders of SDSs in a "right-to-know station" in a supervisor's office, not realizing that the supervisor may lock her office when she goes to lunch, consequently preventing workers from accessing the documents!

OSHA has specifically allowed for the use of internet or software-based systems to provide access to SDSs (see, for example, [this letter of interpretation](#)) if the system provides access to the specific SDSs for chemicals at your facility, an alternative system or process is in place for providing access during foreseeable emergencies such as power outages, and the system can generate a printed copy to meet possible requests from employees or OSHA representatives, and be available for first responders and medical personnel in cases of emergency.





OSHA states [in a 2015 enforcement directive](#) that you “must not require employees to perform an Internet search (e.g., Google ®, Yahoo ®) to view/obtain the SDS.” One reason for this is that OSHA has often stated, as they have in this [2007 letter of interpretation](#), that an SDS “must be specific to each manufacturer’s product,” and therefore SDSs that “are not specific to the manufacturer and to the chemicals being used in the workplace, and which do not contain the name and contact information of the responsible party for the content of the data sheet, do not meet the intent of the HCS.”

In the case of an internet search, we can see that we have no control over the outcome of the search results, which can vary by person performing the search and each time a search is performed. Therefore, there is no way to ensure the results they’re seeing contain the correct document nor that the employee will be able identify the correct, up-to-date version of the document that pertains to the specific product in your inventory. For example, an employee might find the chemical used in your facility, or a similar-sounding but different chemical made by a different supplier, and the consequences of mishandling, misusing or improperly storing or disposing of the chemical due to referring to the wrong document, can be life-threatening.

To determine if your system for providing right-to-know access to SDSs meets OSHA’s ‘readily available’ expectations, remember that the real test is whether it is able to provide *quick* access to SDSs. How quick? Well, think of how quickly you’d like to be able to retrieve an SDS in the event of a major chemical spill, fire, or other emergency, and now ask how well your current system would be able to perform. If you have concerns there, you should strongly consider a system that can cut down response time to mere seconds, such as a cloud-based SDS management system.

Of course, another important way you’re able and required to provide your workers with access to hazard information is via container labels, which is the topic we turn to next.

Labeling Requirements: Understand Your Identity

The first thing you need to do to manage your labeling requirements effectively is to figure out who you are. I realize that might sound a little strange, but it’s true. Under the HazCom Standard, your obligations are determined by your identity in the chemical supply chain. So, take a moment to ask yourself the following questions.



1) Do I manufacture, import or distribute hazardous chemicals?

The HazCom Standard defines a chemical manufacturer as “an employer with a workplace where chemical(s) are produced for use or distribution. A chemical importer is “the first business with employees within the Customs Territory of the United States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.” So basically, we need to determine if we are causing new chemicals to enter the workplace, either by directly making them or by bringing them into our workplace from outside the country.

A chemical distributor supplies chemicals to other distributors or employers. In other words, in most cases, if we are sending chemicals to other downstream users, we are distributing them according to OSHA’s view.

This is all important to understand, because the HazCom Standard requires chemical manufacturers, importers or distributors to ensure that each container of hazardous chemicals leaving their workplace be labeled according to very specific requirements, which we’ll review shortly.

2) Do I remove chemicals from their shipped containers and place them into secondary containers?

Secondary containers are often also called *workplace* containers, because they are literally the types of containers an employer will store chemicals in *within their workplace* after removing them from the containers shipped to them by the manufacturer. As we’ll see, there are many different kinds of workplace containers, and you have labeling obligations for all of them!

Before we dig into the details of labeling requirements, please keep in mind that your identity in the chemical lifecycle is not necessarily going to be one or the other as it relates to shipped container labeling and secondary or workplace container labeling. If you don’t manufacture, import or distribute chemicals, you’ll only have to worry about workplace container labeling. However, if you’re a chemical manufacturer, you will almost certainly also have workplace container labeling obligations for the secondary containers you use to move or store the chemicals that you ultimately package and ship. And if you’re an importer or distributor, depending on what you do with the chemicals you receive once you receive them — i.e., if you transfer them to other containers before you repackage them for example — you too will have workplace labeling obligations. So, you may very well play both of

these roles to different degrees under different circumstances. If your operations change in a significant way, remember that your labeling requirements may change with them.

Now that you have a clearer understanding of your own identity, let’s continue on with a closer look at the requirements for shipped labels and workplace labels.

Shipped Label Requirements

If you are a manufacturer, distributor or importer who ships chemicals to downstream users, you’re going to need to develop shipped labels and affix them to the immediate containers of those chemicals before you ship them to customers.



Of course, the very first thing you need to do is to classify the hazards of your chemical products. Appendix A of the HazCom Standard describes how to classify the health hazards of your chemicals, and Appendix B describes how to classify the physical hazards of the chemicals. Once you’ve completed that process, you’re ready to move on to Appendix C, which tells you how to allocate physical and health hazard information on a shipped container label.



1 ACETONE

DANGER 2

- Highly flammable liquid and vapor
- Causes serious eye irritation
- May cause drowsiness or dizziness

4   **3**

- Keep away from heat, sparks, open flames, hot surfaces. No smoking.
- Use explosion-proof electrical, ventilating, and lighting equipment.
- Use only non-sparking tools. Take precautionary measures against static discharge.
- Avoid breathing vapors, mist, and spray.
- Wash hands and other exposed areas thoroughly after handling.
- Use only in well-ventilated area.
- Wear protective gloves, and eye, face and respiratory protection.

- If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- If inhaled: Seek fresh air and keep comfortable for breathing.
- If in eyes: Flush for at least 15 minutes. Remove contact lenses if possible. Continue rinsing.
- Call a poison center or doctor if you feel unwell.
- Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.
- In case of fire: Use dry chemical, CO₂, water spray (fog) or foam.
- Dispose of contents/container to local, regional, national, and international regulations.

5

(Sample Only)

6 [Company Name, Street Address, City, State/Province, Country
Telephone: (Country Code#)-###-####

There are six required elements of a shipped label:

1. Manufacturer identification: The name, address and telephone number for the chemical manufacturer. An [OSHA letter of interpretation](#) recently clarified that if you import chemicals, and the SDSs are authored outside the United States and list foreign phone numbers and addresses for the primary contact information in Section 1, you are responsible for authoring new SDSs that contain domestic contact information in Section 1.

2. Product identification: The identification of the hazardous chemical, either by the chemical name, CAS registry number or batch number.

3. Signal word: This is a word used to indicate the severity of the chemical hazards. There are only two possible signal words you'll see: "Danger" or "Warning." The most severe hazards are designated by the signal word "Danger." What if the same chemical product has hazards that merit a "warning" and others that merit a "danger?" You'll still only see one of the two words on the label, and in this case, it would be "danger", because it's the more severe of the two.

4. Hazard statement: These are statements describing the specific hazards of a chemical, such as "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin." Chemical manufacturers should always use the same exact statement for the same chemical hazards, so that the dangers are completely clear to all users.










5. Precautionary statement: These are recommendations for measures users can take to minimize risks of use and storage, or to respond to chemical incidents. These statements may address storage practices, including incompatible materials to avoid. For example, keep drums of strong acids away from strong bases! (As a consultant, I once saw a location that had drums of sulfuric acid stacked directly

on top of drums of sodium hydroxide. If you know even a little bit about chemistry, you know that's probably not a good idea!) Statements may also include clean-up and disposal measures in the event of a release, and first-aid treatment following an exposure.

6. Hazard Pictograms: Earlier, we talked a little about the reasons behind the United Nations' (UN) development of the Globally Harmonized System. As you may recall, stakeholders from multiple countries and agencies discussed shortcomings with hazard communication regulations. The GHS incorporates methods to correct these issues, for example, by replacing the high degree of variability in SDS format with a standardized 16-section format. The GHS also harmonized the symbols that could be used by chemical manufacturers to communicate the hazards of their chemical products. These symbols are referred to as pictograms.

The GHS includes nine pictograms which are used to represent the various hazard classifications for a hazardous chemical. Eight of them are mandatory if triggered by the hazard classification process, while the 9th pictogram (for environmental hazards) is optional since it addresses environmental hazards which are not covered under OSHA's jurisdiction. The pictograms must be represented on shipped labels as shown below with the exact black hazard symbols, on white backgrounds, surrounded by red diamond borders.



Health Hazard  <ul style="list-style-type: none"> • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity 	Flame  <ul style="list-style-type: none"> • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides 	Exclamation Mark  <ul style="list-style-type: none"> • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  <ul style="list-style-type: none"> • Gases Under Pressure 	Corrosion  <ul style="list-style-type: none"> • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals 	Exploding Bomb  <ul style="list-style-type: none"> • Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle  <ul style="list-style-type: none"> • Oxidizers 	Environment (Non-Mandatory)  <ul style="list-style-type: none"> • Aquatic Toxicity 	Skull and Crossbones  <ul style="list-style-type: none"> • Acute Toxicity (fatal or toxic)

The six required elements don't have to be presented in any particular order on the shipped label, but they must be present when required, and follow the allocation requirements in Appendix C. You may provide any additional information you think might be helpful as long as the shipped label includes the six required elements above, and doesn't include any information that contradicts the required information or causes confusion.

What would OSHA consider to be contradictory or confusing information? Great question! One example might be a diamond-shaped symbol in red, white and black that is not one of the nine pictograms shown above. Such a symbol could be easily confused for a GHS/HazCom pictogram. In an emergency, any uncertainty about a chemical's hazards is dangerous.

Workplace Labeling Requirements

One important thing to know about workplace containers is that you most likely have a lot more of them than you realize.

You are probably aware of some of the more visible containers, such as transfer buckets and safety cans, but you might not realize that machine reservoirs are workplace containers, too. These are the internal tanks within larger machines for holding oil or coolant. These tend to be out of sight and out of mind, because you don't notice them the way you notice a drum or tank sitting in the corner. However, you have obligations to communicate the hazards of these chemicals to your employees all the same.

In some workplaces, there may be dozens or even hundreds of machines with fluid reservoirs, and if you don't have a labeling system for those containers, your employees are at risk. Knowing the number and capacity of all of these containers will also help you determine the applicability of environmental regulations like Spill Prevention Countermeasure and Control Act (SPCC), or Emergency Planning and Community Right to Know Act (EPCRA) Tier II reporting.

While you're inspecting the reservoirs of large machines out on the shop floor, you may also want to direct your attention to the area underneath those machines. You'll likely see "drip pans" beneath the fluid hoses and fittings, as well as a little bit of leakage of whatever fluid is in the system – typically some form of oil. Hopefully you'll also see a workplace label on the pan indicating the fluid inside and any associated hazard information. If you don't, you at least can take consolation in knowing you're far from being the first person to forget to label these containers, but it's important that you get busy labeling them right away!

So, a big part of getting workplace labeling right is recognizing all of your secondary containers, and making sure that any and all of them are labeled. Another important piece is understanding the HazCom Standard's requirements for workplace labeling.



Unlike the very prescriptive requirements for shipped container labels, HazCom requirements for workplace labels are more flexible. Employers have several options. You can either replicate the manufacturer's shipped container label, use some combination of the product identifier and GHS label information, use a homegrown template that includes a product identifier and other desired information, or an alternative system like NFPA. If using a system like NFPA, be sure you're adding the chemical product identifier to your labels, since this is required under HazCom but is not a standard element found on NFPA labels.

When choosing any option other than replicating the shipped container label, you must be sure the hazard information communicated doesn't contradict the hazard information prescribed for the chemical under the GHS-aligned HazCom Standard, and you must also ensure your employee training covers all the hazards associated with the chemical including hazard details you may not be communicating information about on the label. With NFPA labels for example, on their own, they only address immediate, short-term/acute hazard information, and not long-term hazard information, but OSHA requires you to train and protect employees on all hazards. Please see the image below to get an idea what these options might look like.



While you have multiple options, they're not equally good! The easiest, most effective option is to simply replicate the manufacturer's shipped label. Do this, and you've met your labeling obligations. If you choose an option other than that, you're going to need a system in place to

provide any information from the shipped label that isn't directly included on your workplace label. That additional information may include training, work instructions, risk assessments, signage, and the SDSs for the chemical in question.

The key point here is that any alternative workplace labeling system, consisting of the label plus other information, must provide your workers with immediate access to specific information regarding the physical and health hazards of the chemical. Even more importantly, you'll need to be ready to prove to OSHA that your system works in the event they ever ask — such as during an inspection. That's why we recommend simply replicating the shipped label whenever possible.

If you consistently work with specific chemicals in your operations and place them in workplace containers, you can buy secondary containers from certain industrial supply stores that come with pre-affixed labels containing the chemical name and other hazard communication elements, such as pictograms. In a recent letter of interpretation, OSHA stated that the use of these pre-labeled containers is consistent with their workplace labeling requirements, as long as your system makes all hazardous chemical information available to workers. This includes any information from the shipped label that's



not included on the workplace label. So again, use the labeling system that works best for you, but replicating the shipped label for use on your workplace containers remains the easiest, most direct way to demonstrate compliance in the event of an OSHA inspection.

A good software-based chemical management solution can be a big help here. The right software can let you quickly print a workplace label that replicates the shipped label, giving you a consistent workplace labeling system that efficiently conveys chemical hazard information to your workers. Do you have smaller workplace containers such as test tubes and vials that don't have enough space for a full shipped label, and may often need to be replaced as they become illegible? A good solution will enable you to easily create and print labels containing selected GHS elements that, in combination with training and other elements, can help you provide the required hazard information to your employees.

Lastly, the details of your labeling system need to be clearly documented in your written HazCom Plan. We'll take a closer look at the challenges of writing and maintaining a good HazCom Plan in the next section.

The Written HazCom Plan: Understanding Applicability



The best way to tell the story of your Written HazCom Plan requirements is to follow the advice of the Mad Hatter in Disney's film of "Alice in Wonderland:" "Start at the beginning. And when you come to the end, stop."

And when it comes to requirements for Written HazCom Plans, the most logical choice of a beginning appears to be the question of whether you actually need one.

Spoiler alert: You probably do. But let's look at exactly what the HazCom Standard says.

First of all, you should know that the main trigger to the requirement to develop a written plan is having hazardous chemicals, as defined by the HazCom Standard, in the workplace. There aren't many exceptions to this requirement, and in fact, a 2015 enforcement directive makes clear that an employer needs to develop a plan "whether the employer generates the hazard or the hazard is generated by other employers." So, if your own operations don't involve hazardous chemicals but the operations of your on-site contractors do, you still need to develop a plan that specifically addresses those chemical hazards, including procedures for training your own employees about those hazards.

As it turns out, there are only two situations in which employers subject to OSHA's HazCom Standard, who have hazardous chemicals in the workplace, do not need to have a Written HazCom Plan.

The first instance pertains to work operations where employees only handle chemicals in sealed containers that are not opened under normal conditions of use, such as many storage and distribution warehouses. If you're an employer at such a facility you need to: ensure that labels on incoming containers of hazardous chemicals are not removed or defaced; maintain



copies of SDSs received with shipments and obtain SDSs when requested by employees; make SDSs accessible to employees during each work shift; and provide employees with HazCom training. However, you would not need to have a Written Plan.

Even if your facility handles only sealed containers, you might still find it valuable to have a Written HazCom Plan, considering that you need a system for storing and providing access to SDSs, maintaining shipped container labels and providing employee HazCom training. In the event of an OSHA inspection, you'd need to convince the inspector you're meeting your compliance obligations, and without anything written down (for example, a description of your training program), you may have some difficulty with that. For this reason, it's worthwhile to go beyond the regulatory requirement and draft a Written Plan. It can help explain and provide documented evidence of your HazCom management practices.

The second example of an employer who does not need to have a Written HazCom Plan pertains to laboratory operations subject to OSHA's Laboratory Standard, which covers "laboratory use" of small amounts of a limited variety of chemicals on a non-production basis. If your laboratory operations fall under that category, you'd need to have a written Chemical Hygiene Plan (CHP) instead, which contains

information and plans more specific to a lab environment, such as maintenance of fume hoods and decontamination procedures. But remember, if your lab engages in production-related operations, including quality control, the Lab Standard would not apply and you'd need to have a Written HazCom Plan for those operations.

Learn the Background

As we can already see, we need a pretty good grounding in the HazCom Standard to understand the requirements. You need to walk before you can run, and you need to ground yourself in the HazCom Standard before you sit down to start writing your plan. While this may seem like an obvious, logical place to start, surprisingly, few people actually seem to do this, which may help explain why deficiencies with the Written HazCom Plan are among the most commonly cited HazCom violations for employers.

Be sure to get a broad understanding of the Standard as a whole, and of requirements for the Written Plan in particular, which are found in 1910.1200(e). These requirements include:

A list of the hazardous chemicals known to be present. Another name for this is "chemical inventory list." As mentioned before, this list

needs to include all chemicals for which you're required to have an SDS. The Standard gives you some options for how you structure it. If you have a smaller establishment, it can be simple to just list all the hazardous chemicals in your workplace. If you have a larger facility, it might make more sense to compile lists of hazardous chemicals by work area or department, and then to compile an overall, comprehensive list of hazardous chemicals for the full facility. As a reminder, just be sure to use a product identifier that matches the identifiers for those same chemicals on the SDSs in your SDS library, on your shipped container labels, and your workplace labels to remove ambiguity about the identities of chemicals.

Methods the employer will use to inform employees of the hazards of non-routine tasks. This is an often-missed aspect of the HazCom Plan. Employers generally know they need to address exposures employees may have during usual work routines, but often fail to plan how to inform employees of hazards they may encounter during non-routine tasks. For example, an employee working in a chemical mixing operation may occasionally need to drain and clean a reaction vessel. During this task, they may use cleaning solvents they don't normally use and potentially be exposed to fume concentrations far above those encountered during their normal job tasks.



Methods of informing employees about the hazards of chemicals in unlabeled pipes in their work areas. You need to state who's responsible for informing workers about the identities and hazards of chemicals in unlabeled pipes before work begins in those areas.

Methods of managing HazCom, including providing access to SDSs, at multi-employer worksites. The management goes in both directions. You need to determine how you will inform your own workforce about the hazards of chemicals brought onsite by other employers, as well as how you'll inform other employers and contractors about the hazards of *your* chemicals, and provide access to the SDSs and information about your workplace labeling system.

Description of how the Written Plan will be made available to employees. You can maintain a hard copy of your plan, or store an electronic copy including but not limited to saving it on a desktop computer, an online resource, or a mobile device as long as your employees know how to access it.

Description of labeling management practices. This should include details about your workplace labeling system. For instance, do you replicate the shipped label, or do you use a label with a product identifier and select other hazard communication information, and provide the remaining information on the shipped label using supplemental information like training, work instructions, or signs?



Methods of storing SDSs and providing right-to-know access to them. Make sure you fill in the important details like the method of providing emergency back-up access.

Description of your HazCom training program. We'll talk more about training in the next section. For now, remember that your training program has to inform your employees about the requirements of the HazCom standard in general, and the details of HazCom management at your workplace in particular, and the health and physical hazards present at your site.

Before you even put pen to paper or fingers to keyboard, collect the information you need. Do a walk-through of your whole facility to identify

chemicals, being sure not to miss chemicals in boiler rooms, maintenance areas, storage sheds, or inside reservoirs of large machines. Talk to supervisors and Purchasing Department representatives to fill in any gaps.

Go beyond identifying obvious chemical containers, too. Look for examples of unlabeled pipes that may contain chemical products. Also pay attention to the ways chemicals are used, and specific hazards that may be created from their use. Is there dust visible? What about fumes or vapors? These are details you'll need to know to be fully aware of the chemical hazards in your facility and the routes of exposures employees may have.



As all of the above requirements show, you'll need to be very familiar with not only the requirements of the HazCom Standard, but also specific operations at your establishment pertaining to hazardous chemicals. Which brings us to our next point.

Write it Like You Mean It

I hope it's becoming clear by now, but let's state it right out: Writing a HazCom Plan is serious business.

Don't make the mistake that many employers make, and simply find a template from somewhere and stop customizing the template for your workplace after filling in some of the obvious details like company name and address. There are many templates out there issued by trade associations, safety organizations and professional groups, and it's fine to take advantage of that material. But take it for what it is: help on getting started, rather than a shortcut to your destination. A better template that gives you the guidance needed to actually create a compliant written plan will give you a big advantage here.

In my experience, many employers who have a less than robust HazCom Plan are working from a perspective of trying to simply "meet obligations" or "document compliance," which is to say that

they see it largely as a paper exercise. That also explains why once employers complete the Written Plan, they tend to file it away, whether on a computer desktop or on a shelf, instead of actually using it on an ongoing basis to manage chemical safety.

That's their loss. First of all, failure to have a Written Plan that accurately describes hazards and hazard communication practices at your establishment can lead to compliance violations, and fines. Federal OSHA issued 4,806 violations for Written Plan deficiencies between December 1, 2013 and July 30, 2018. At the 2019 National Safety Council (NSC) Congress and Expo, an OSHA representative stated that written plan violations were the most frequent of the 3,671 HazCom violations the agency issued during fiscal year 2019. The urgency of getting compliance right is even greater now, since the agency recently (as of January 2020) increased monetary penalties by 1.8% compared with 2019 levels.

Remember that the plan has to be specifically about your hazards, your management practices, and your program details at your establishment. Make sure your plan includes all of the site-specific details listed in the "Learn the Background" section of this ebook. Additionally, make sure you've spelled out who is responsible for key aspects of your program. A 2015 enforcement directive makes clear

that OSHA expects your plan to designate the individuals responsible for managing labels on shipped containers, and workplace labels, and for obtaining and managing access to SDSs.

But the biggest loss that can happen if you treat your HazCom Plan as just a paper exercise is the ability to improve safety for your workforce. It takes time and effort to develop a good HazCom Plan, but the reward is a blueprint for increasing chemical awareness, reducing risks of chemical exposures and related injuries, and potentially improving employee retention.

Spend the time to write a good Plan, and use it as your playbook, which is what it's intended to be.

Make Your Employees Aware of It

The effectiveness of your Written Plan, and the ultimate benefits of having it, are achieved when your workforce is aware of the Plan's existence, understand its content, and know where and how to access it.

When I was involved in corporate EHS, I used to find it useful to casually ask employees I passed walking through the facility if they knew where to find the HazCom Plan if they ever wanted to review it. Many times, they knew exactly where



and how to do that, but other times they didn't. That usually meant that it was time for at least a quick refresher on the basics of the program with their department, and that it might also be a good idea to review the details of our HazCom training program and see if there were any reasons for the gap in awareness we were seeing.

If your workers have job assignments requiring travel between different workplaces, you may keep the Written Plan at the primary work location. However, in that situation it's going to be even more important to be inform all employees how to access the plan, and confirm their understanding.

We can start to see here that there is a close relationship between the requirement to have a Written HazCom Plan and to conduct training. They reinforce each other, and the changes in one should lead to changes in the other.

Update When Needed

When might we need to change our written HazCom plan? Basically, we'd need to update the Plan whenever it no longer accurately described the chemical hazards and hazard communication practices at our facility.

For example, let's say that since the last time we updated our plan, we brought flammable chemicals on-site. That means we should update

our Written Plan to include the new information, as well as any relevant details about storage and safe usage practices, and if we've never provided training on flammable hazards before, the HazCom Standard requires us to train employees on that hazard class. The mutually reinforcing relationship between the HazCom Plan and training should come into play here. The training should include the information about flammables in the Written Plan, and the Plan should spell out the specific kinds of training employees need to have.

You should also update the HazCom Plan, and the relevant aspects of training, if you make any other significant changes to your program, including workplace labeling, methods of providing access to SDSs, details of the Written Plan itself, or the identities of individuals with specific responsibilities, such as oversight of labeling and SDSs. If you have a plan with names of people who no longer work for your company listed for the latter, it's a sure sign that you're not updating your plan as often as you should, and could be risking violations and chemical-related incidents as a result.

Someone out there might now be thinking, "Okay, but when do I need to update the Plan? In other words, how long can I go without updating the Plan before OSHA decides to issue me a citation?" I can understand the motivation behind that question, but it's the wrong question.

You're more likely to comply in the long run if you realize that you're going to need to revisit and revise your Plan. Many people spend the effort to write a HazCom Plan only to end up with a static document that just gathers dust and doesn't change as their HazCom management practices change — something that OSHA will be checking if they visit your workplace.

It is of a matter for any given enforcement officer to decide whether the specific details she's seeing constitute a HazCom violation. But whether or not you will get a violation is not the only consideration, or even the most important one. The more important factor, since your plan is intended to be your playbook, is whether failure to update your plan will result in a loss of effectiveness of your HazCom program as a whole, and a loss in safety for your workforce. Any changes to your HazCom program that are not described in your plan probably also won't be adequately communicated to employees, and that may have a serious impact on your safety performance. Go beyond compliance, and strive for the most effective program possible.

Of course, your Written Plan will only do its job if you train your employees on it, so let's take a look now at how to do your HazCom training more effectively.





HazCom Training: What Do I Need to Include in My Training Program?

Good question! You'd be surprised how many times employers put together a HazCom training program without even checking whether they're covering everything the standard requires.

- It's a good idea to go right to the requirements themselves, which are available under OSHA's 29 CFR 1910.1200(h) (3). According to the Standard, your HazCom training needs to cover the following:
- The contents of the HazCom Standard itself, so that employees clearly understand the requirements of chemical manufacturers to

provide safety data sheets (SDSs) and shipped container labels to downstream users, and the responsibilities of their employer to provide them with information about the hazards of the chemicals in the workplace.

- Ways of detecting the presence or release of chemicals, whether through use of monitoring equipment or simple observations, such as odors or visible evidence such as sheens or stains. If you use digital monitors, talk about where they are, what they measure, and how to interpret the readings. Make sure that the methods discussed here line up with the specific chemicals and hazards you have at your facility. If you have compressed gases, let your employees know they should be listening for the telltale hissing sound that means that gas is escaping.
- The physical and health hazards of chemicals in your workplace, including those from simple asphyxiants, combustible dusts and pyrophoric gases, as well as any hazards not otherwise classified. The same principle explained above applies here, too: If the hazard is present in your facility, you'd better be covering it in your training.
- The ways that employees can protect themselves from chemical hazards, including through use of personal protective equipment (PPE), safe work practices, engineering controls, and any other specific procedures or controls you've implemented. It's important to be sure, for

both the safety of your workplace and the compliance of your training program, that you actually have some form of exposure control identified for all of the specific hazards present in your facility. Be clear and detailed enough to eliminate any potential confusion. For example, if you use different kinds of respirators because of different chemical exposures, it's important that your employees understand which chemicals they work with should be conducted with respirators, and which specific types of respirators are used with them.

- The details of the employer's Hazard Communication Program. During our discussion of Written Plans in Part Four of this series, we made the point that OSHA expects your program to be written like a playbook, describing the specific management practices for the chemicals at your facility. That needs to include how you will manage SDSs and shipped labels, your facility's chemical inventory, methods for accessing SDSs at your facility, the details of your workplace labeling system, how to properly store chemicals, what to do in the event of chemical emergencies, who to seek out for more information, how/where to access the written plan, and any other details you believe are important for effective HazCom management. We also pointed out that it's not enough to simply write down (or type up) these details – your employees need to understand them.



Remember, your training program and written HazCom plan are complementary pieces of your chemical management system, and changes or updates to one will likely necessitate changes to the other.

Who Needs Training?

That's another great question! It's also one that is not asked as often as it should be. Many employers provide HazCom training, and do a pretty good job of it in terms of providing the right training content. Where many employers fall short, however, is identifying all of the workers they need to train.

It basically comes down to the question "Which of my employees may be exposed to hazardous chemicals at work?" In a guidance document, OSHA states that this scope is intentionally broad, and "includes any situation where a chemical is present in such a way that employees may be exposed under normal conditions of use or in a foreseeable emergency."

Some employers may need to train all of their employees. You need to be familiar with your operations, the job tasks involved, the associated chemicals, and the possible routes of exposure before you can determine which members of your workforce require training.



Don't forget contract and temporary workers! OSHA's recent guidance on protecting temp workers, including its [Temporary Worker Initiative \(TWI\)](#), makes it clear that the Agency expects the staffing agency and the host employer to share responsibility for worker safety. If you use contract or temp workers at your facility, you as the host employer will be responsible for training them about the hazards and HazCom management practices at your facility. Make sure that, among other things, your training includes how to access SDSs, since that has a way of becoming important very quickly in the event of an emergency.

Your staffing agency should be training their people on general HazCom requirements, and on the hazards of chemicals they regularly work with from one job site to another. Still, you'll want to keep open lines of communication with the agency to make sure that each of you understand each other's roles and responsibilities, and that no gaps in training or communication exist.

How Should I Conduct My Training?

The short answer is "any way you want." You can use slide decks, films, software-based training, classroom exercises, or all of the above. Whatever training methods and materials you choose, you'll get better results if you make sure the training is engaging for your employees.

We've all sat through training sessions where the instructor simply stood at the front of the classroom and lectured, or simply showed a training video and that was it. Not the most effective method of training, and certainly not the most entertaining, was it? You should experiment with ways to make training more interactive and participatory, and at the very least, encourage and allow questions. That makes it far more likely that employees will be engaged throughout the training and better understand the material, which brings us to our next point.



Make Sure Training is Effective

This seems like a no-brainer, right? Training ought to be effective. Unfortunately, we sometimes tend to focus more on simply conducting the training and then being able to prove that we've done training.

As it turns out, though, even the most well-organized records won't convince OSHA that you've met your HazCom training requirements. If OSHA were to come to your workplace to evaluate your HazCom compliance, they'd instead focus on finding out if your employees understand the hazards in their workplace, know how to access SDSs, and are aware of safe work practices. As OSHA says on the [webpage for the 2012 HazCom final rule](#), "The Hazard Communication Standard in 1983 gave the workers the 'right to know,' but the Globally Harmonized System gives workers the 'right to understand.'"

How much awareness does OSHA expect workers to actually have at any given time? OSHA clarified this in a [HazCom guidance document for small business entities](#), which states "OSHA does not expect that workers will be able to recall and recite all data provided about each hazardous chemical in the workplace. What is most important is that workers understand that they are exposed to hazardous chemicals, know

how to read labels and SDSs, and have a general understanding of what information is provided in these documents, and how to access these tools."

Let's talk about what this means in practice, starting with the issue of language. Some employers seem to think they need to train in English, perhaps because they're confusing their training requirements with the language requirements for SDSs and container labels. In reality, you need to train in a language that your employees understand. This doesn't mean most of your employees, either – it means ALL covered employees. If most of your employees speak English, but even a small number are non-English speaking and those employees work with hazardous chemicals, you must provide training for those employees in the language they understand.

Going beyond language, you also need to train in a *manner* your employees understand. This means you must account for any limitations in literacy level, vocabulary or communications within your workforce. The more workers you have, the less likely it will be that a "one size fits all" approach to training will work. For example, training programs that heavily rely only on presentation of written material will not work very well for training workers with limited literacy. As a general rule, if you find that you need to provide an employee with regular job instructions in a certain manner to get the points across, you should provide your HazCom training the same way.



Do you need to train on every chemical you have in your chemical inventory? No, the Standard gives you some latitude there. You can either train your employees on all of the individual chemicals they may be exposed to, or you can group your chemicals by hazard classes and categories and train on those. Do what makes the most sense for you. If you don't have very many hazardous chemicals, it might be best to just train your employees on all of them. If you have a huge chemical inventory, grouping your chemicals into hazard categories probably makes the most sense.

One of the most overlooked ways to improve the effectiveness of your training is to improve the quality of your training objectives. Most of us who've managed HazCom have made mistakes here, your humble author included.



Here's an example. The first time I ever put together a HazCom training program, I wrote a training objective that said something similar to, "Employees will understand the hazards of the chemicals they work with." Now, let's be honest – how many of you have written an objective almost exactly like that one? Why wouldn't you? It sounds good, and understanding the hazards of chemicals is what it's all about, right?

It is, but we need to have clear objectives with measurable or observable outcomes to know if we're really hitting the mark. Looking back at my training objective, we can start seeing the problem. It's too vague, too general. We don't really specify how we'll know that employees are understanding what they should.

It's better to have more specific objectives with performance conditions spelled out. For example, we might say, "Given an SDS, an employee will correctly locate at least three pieces of designated information," or "Employee will list correctly the three steps to take in reporting a chemical release." We can see the difference now: these objectives are not ambiguous, and we'll know if someone has met them. If they haven't, we'll need to revisit our training to find out why, and fix the problem.

Do I Need to Document My Training?

Technically, no. There is no requirement to document training anywhere in the HazCom Standard. That said, there are pretty good reasons why you should.

One of the reasons is that OSHA recommends it, and it even gets pretty specific about what it thinks you ought to document.

- Date of presentation
- Learning objectives
- Training program outline
- Names of participants, identified by employee identification number or social security number
- Names of instructors
- Any objective data, such as test results, demonstrating that learning objectives were met

If you take a close look at all of the items on the list, you might start to understand why OSHA stresses their importance, especially in light of what we've already discussed about training requirements.

You might recall that we need to provide training again after we've changed any aspect of HazCom management, including introducing new physical or health hazards into the workplace, or after finding evidence that training was not effective. Without the right kind of training documentation, that can be difficult to accomplish.

For example, let's suppose we last provided HazCom training before introducing the first flammable chemical we ever stored at the facility. Records containing all of the training documentation details listed above would make it possible for us to know whether or not we trained employees who might be exposed to flammable chemicals on how to safely work with them. This documentation would also make it possible for us to quickly identify who the employees were so we could give them the required training as quickly as possible.

So, you can see why training documentation is one of the keys to keeping your HazCom management system running smoothly and your workforce ready and protected. Maintaining records with this level of detail for all workers can be challenging, especially if you have a large workforce or if you manage HazCom across multiple establishments. Consider the benefits of using modern EHS software to help you centralize this information



and assign and track training for your workers. It streamlines your training tasks and makes it possible to easily verify which training has been completed by which workers so you can know when new or refresher training should be administered and to whom.

Avoid the “Annual Training” Mindset

During my career in EHS consulting and corporate EHS management, I frequently encountered the practice of doing “annual HazCom refresher training.” Often, the practice was accompanied by the belief that federal OSHA requires employers to conduct refresher training annually. However, in reality, OSHA requires you to train your employees before they begin working with hazardous chemicals, and whenever you introduce new hazards into the workplace or find evidence that previous training was not effective.

Some State OSHA plans do require annual refresher training, so you should be aware of your state’s requirements. But even so, remember to avoid seeing HazCom training as just an annual task, since that can be harmful to your HazCom program. Don’t treat your training program like a set of holiday decorations, dusted

off once per year, used exactly as they were the last time, and then put back in storage again. Doing so causes you to go through the motions of training your workforce again on the same exact information you trained them on in the previous year, but since that training occurred you may have introduced new chemical hazard categories or changed key aspects of your management system — like replacing your old physical SDS binders with software-based access, and not updated your training to reflect the changes. If so, your training program has been fossilized and is now deficient of critical information for keeping your workforce safe and your business compliant. Hence, the “annual training” mindset can make it easy to neglect your actual training obligations, which are triggered by dynamic changes to your work environment, hazardous chemical use, and hazardous chemical related-regulations, as opposed to simply being tied to a mere static, fixed point in time.

If you hear anyone in your organization talking about “annual HazCom refresher training,” it’s worth making sure they are aware of OSHA’s actual training requirements, and more importantly, that you’re meeting them. This is not to say that Annual HazCom Refresher training is not valuable, it’s just important to note it’s not the only time during the year when training should occur.



The Big Picture

I get that all of this can seem like a lot to consider, so I recommend taking a step back at this point to look at the big picture again, because that might help us focus on the right things.

Remember that the reason for HazCom in general, training in particular, is to make sure our workers have the information they need to protect themselves from the hazardous chemicals they work with. What we’re really talking about is changing people’s behavior, replacing unsafe behaviors based on incomplete knowledge of chemical hazards with safe behavior based on accurate hazard information. Effective HazCom training lets us accomplish this. When we do training really well, we also create the kind of transparency and two-way communication between employees and management that is necessary to improve our EHS culture.



If you're looking for more help with HazCom training, there are a variety of options available. OSHA's ["Small Entity Compliance Guide for Employers That Use Hazardous Chemicals"](#) is a great resource for understanding HazCom in general, and Appendix B of the publication has useful guidance on training. Also, be sure to look into EHS software solutions that are designed with specific capabilities for HazCom management, including delivery of training content and managing training documentation.

With that in mind, let's now look at some common HazCom management challenges.

Common Challenges: Storage Challenges

Let's start with a quick story. Once, during my years as an EHS consultant, I was doing a compliance assessment of a manufacturing location, and the facility EHS manager escorted me into their main chemical storage room. I immediately noticed that many drums of chemicals were stacked on top of each other. Wondering what these chemicals might be, I took a look at the labels and received a shock, because the top drum in one stack was sulfuric acid, and the drums beneath it contained sodium hydroxide.



If you've had a chemistry course before, you'll probably see the problem here. Sulfuric acid (a strong acid) and sodium hydroxide (a strong base) react strongly, and should not be stored near each other — let alone on top of each other!

My shock wasn't as great as it would've been if I hadn't been consulting for a while and seen similar (if less extreme) storage scenarios. And the chemical management at these facilities followed a typical pattern: they'd done a lot of what they were supposed to do regarding HazCom, such as maintaining a written plan, a chemical inventory and an SDS library — even if they tended to make certain common mistakes in those areas — but they'd received their SDSs and simply filed them away, making them accessible to employees during the workshift, but NOT reviewing and making use of the storage and handling instructions found in Section 7 of the SDS.

It's at times like this, when we remember why OSHA issued the HazCom Standard in the first place and what makes it so valuable. Simply put, we need the information from SDSs and shipped labels to be able to work safely with hazardous chemicals, and a big part of that is knowing how to store them properly. We might have a complete SDS library, an up-to-date chemical inventory, and a thorough and site-specific written HazCom Plan, but if we're storing our chemicals in a way that is dangerous, we're failing to meet one of our most fundamental obligations.

So, be sure to pay close attention to Section 7 of the SDS and use that information to inform your chemical storage practices. Remember, certain chemicals are incompatible with others because they react strongly, such as acids and bases (like those in our example above), or oxidizers and reducers. There are also chemicals such as pure potassium metal or lithium aluminum hydride that react violently with water, and should not be stored anywhere close to a sink or other water source. Then, there are other chemicals that become unstable at high temperatures and should be stored and used away from high-heat emitting sources like furnaces or boilers.

Obviously, you need to know these details about the chemicals in your own inventory and plan your storage practices accordingly.





Emergency Planning

Think of chemical emergency planning as the practice of planning to avoid “unplanned incidents” involving chemicals such as fires or spills, and preparing to respond as quickly and safely as we can to the incidents that occur in spite of our preparation. Safe storage practices, as discussed earlier, certainly help to prevent incidents from happening in the first place, but we have many other emergency planning obligations for which the information found on the SDSs and shipped labels will be helpful.

For instance, it is critical that you know the amounts of chemicals (or sometimes even the amount of certain ingredients within chemicals) stored on-site. This helps with effective emergency planning, and can be part of your regulatory obligations with EPA’s Emergency Planning and Community Right to Know Act (EPCRA).

For facilities with chemicals stored above their threshold limit, which is 10,000 pounds for most chemicals but significantly lower for chemicals listed as extremely hazardous substances (EHSs), compliance with EPCRA includes providing your State Emergency Response Commission (SERC), Local Emergency Planning Committee (LEPC) and local fire department with SDSs or lists of chemicals grouped by hazard categories. You may also need to complete and submit Tier II chemical inventory reports to the same parties by March 1 for those chemicals by March 1 of each year. Be familiar with the threshold planning quantities (TPQs) for EHS chemicals listed in the table in [Appendix A to Part 355](#).

Because it doesn’t take very much storage of an EHS to trigger these requirements, you’ll need to be very aware of which products in your inventory are EHSs or contain them as ingredients, and how much of them you have in your facility at one time.

Pop quiz: How much sulfuric acid do you have in your facility right now? You might not be aware that you have any at all, but if you have lead-acid forklift batteries, you do indeed have sulfuric acid present in your workplace – and probably even enough to trigger regulatory reporting requirements. Given that larger batteries may weigh around 2,400 pounds and contain 18% sulfuric acid by weight, storing just a couple of batteries on hand may be enough to trigger Tier II reporting and emergency planning/notification requirements.

On a more basic level, it’s your business to really know the pictograms and hazard classifications (including hazard statements and precautionary statements) for your chemicals. They are a primary source of information about your chemicals’ health and physical hazards. For example, a chemical classified as “Eye Damage Category 1” will have the hazard statement “causes serious eye damage,” along with specific precautionary statements based on the classification. These precautionary statements also provide specific instructions for prevention, response, storage and disposal of the chemical.

Applicable pictograms, hazard and precautionary statements are required elements of a shipped container label, and are included in Section 2 of an SDS.

As part of your obligations as an employer under the HazCom Standard, you must ensure that your workforce is familiar with this information and where to find it, and that you actually use the information to inform and effect your emergency planning. Investigations following many real-life chemical accidents often trace the causes back to organizations simply failing to actively incorporate this information, resulting in gaps in areas like risk assessments and personal protective equipment (PPE) evaluations.



Related issues arise for organizations when they fail to do the following: update their emergency planning as new hazard classes of chemicals enter the facility; update their plans when manufacturers provide them with new SDSs containing revised classifications for existing chemicals; or update their plans when emergency drills or real-life incidents identify problems with existing emergency plans.

Sometimes we make the mistake of thinking about emergency planning as something that rests entirely on our own organization. We may develop plans involving our local fire department, the area hospital and various other first responders, but don't include those parties in the planning stages and don't provide them with the complete, updated information about our chemicals they need to be able to perform their roles effectively. Unfortunately, too often, the very first time the local fire department ever actually sets foot on a property is when they arrive to respond to an emergency.

Emergency planning is not something businesses should do on their own – it's something businesses, emergency responders and regulatory agencies need to do together. It's a collaborative process that goes beyond the sharing of information, as important as that may be. It's about having relationships with all stakeholders, involving them early in the

process and making sure there are no gaps in communication that could prove costly during an emergency.

In addition to doing a thorough job identifying the hazards of your chemicals and associated emergency response measures, also consider mapping your chemical storage locations onto a diagram of your facility, and sharing this with your local fire department along with a current chemical inventory list and copies of your SDSs. Do what it takes to make sure your first responders are prepared should a chemical emergency occur. The best modern EHS management software makes it easy to map your chemical storage locations and share this information, as well as chemical SDSs, with first responders.

You work hard to manage HazCom, so make sure it works just as hard for you! Effective management and sharing of emergency planning information is about more than just avoidance of bad outcomes – it's a positive benefit to your business and your entire community.

Regulatory Standards

One of the significant challenges of managing chemicals is identifying those that are subject to specific regulatory obligations. Let's consider

the issue of emergency planning again for a moment. We've already seen that chemicals listed as EHSs trigger Tier II reporting and notification requirements at smaller storage

thresholds than other chemicals. Similarly, certain listed substances are subject to [Toxic Release Inventory Reporting \(TRI\)](#) under Section 313, and trigger TRI (aka "Form R") reporting based on the amounts manufactured, processed, or otherwise used throughout the calendar year.

These are far from the only regulatory standards that may apply to our chemicals. For instance, for US facilities, we need to identify which of our chemicals may be listed as [Clean Air Act \(CAA\) Hazardous Air Pollutants \(HAPs\)](#) to comply with EPA air emissions permitting requirements, and which chemicals are found on EPA lists of hazardous wastes, so we can properly manage the chemicals once they become a waste stream – which is something that often makes chemical management particularly vexing!

Regulatory agencies have often targeted chemicals that pose especially significant hazards for specific requirements to protect human safety and the environment. Methylene chloride is one example. Evidence has linked exposure to methylene chloride with increased cancer risks and adverse effects to organs such as the heart and liver. In my experience, it's another example of a chemical that many people don't



know they have hiding in their inventory. When I used to do environmental compliance audits for manufacturing facilities, I always made a habit of checking the ingredients on aerosol cans of degreasing sprays. Methylene chloride was an ingredient in these sprays fairly often.

Facility managers rarely knew that methylene chloride was present, since there was nothing about the name of the chemical product that provided an obvious clue. Because they didn't know they had it, they couldn't demonstrate they were in compliance with OSHA's methylene chloride standard, which requires employers to determine whether any employee exposures exceed the action level (AL) of 12.5 parts per million (ppm), measured as a time-weighted average (TWA) in the air, and to take various protective measures when employees exposures exceed the AL. It should be noted that EPA has also recently proposed taking its own separate measures regarding methylene chloride, so the regulatory burden of having this chemical in your workplace may get even bigger.

Other sets of regulations apply to facilities outside the US. For instance, Canada's [National Pollutant Release Inventory Reporting \(NPRI\)](#) requirement is roughly analogous to TRI reporting in the US, triggering reporting for certain facilities, activities, and usage amounts of chemicals listed on one of 6 different substance lists.

To be able to identify and meet different regulatory obligations, we need our HazCom information to be as accessible and usable as possible. We need access to ingredient information in Section 3 of our SDSs to know what individual chemicals are actually present in our products, and to any regulatory information that may be included in Section 15, when provided by the manufacturer. The problem is, the larger our chemical inventory is, the harder this task gets.

Here's an example from my own past. When I used to prepare TRI/Form R reports as a consultant, I needed to get full chemical usage information from the client, as well as a giant stack of all SDSs for every product used. Then I sat down with the stack of documents, reviewed the ingredients listed for each product, and highlighted all of those listed as TRI-reportable, taking care not to overlook chemicals because of alternate names. The process took quite a while and almost always resulted in a headache, and sometimes in an initial mistake or two I'd have to catch by carefully reviewing all of my work.

Thankfully, better strategies are available today. Look into modern chemical management software solutions, which can provide you with ingredient indexing functions to have full visibility of your true inventory at the ingredient level. The best solutions even flag those chemicals on specific regulatory lists, so you can bypass the



tedium of the past, while reducing the potential for mistakes and oversights that can compromise your regulatory compliance status.

Industrial Hygiene

Industrial hygiene (IH) as related to chemical exposures is another area where ingredient-level knowledge of your inventory is important. For instance, as discussed above, if we don't know that we have methylene chloride as an ingredient in some of our chemical products, you're pretty unlikely to include exposure monitoring for it in your IH program, which leaves your employees at risk and brings you out of compliance with OSHA's methylene chloride standard.



It's worth pointing out something that you're probably noticing already, which is that an agency's regulations are intended to function as a whole, in an interrelated way. So for example, [OSHA's Air Contaminants standard \(1910.1000\)](#) establishes airborne exposure limits for various listed chemicals, and it assumes that the employer is aware whether these chemicals are present in the workplace because of SDSs manufacturers must provide under the HazCom Standard.

Of course, it is up to you as an employer to make sure that this information is accessible and actionable enough to let you develop a good IH sampling program. That includes not only knowing what chemicals you have, but also knowing which have OSHA exposure limits such as Permissible Exposure Limits (PELs), Short-Term Exposure Limits (STELs), and ceiling values. Employers often miss the latter two in sampling programs, because they focus only on 8-hour time weighted average (TWA) concentrations for purposes of evaluating compliance with the PEL.

That's only the beginning of your IH obligations. You also need to determine which of your employees you will include in your sampling, based in part on determining Similar Exposure Groups (SEGS), which are groups of employees who'd likely have very similar exposure patterns on based on job tasks, frequency and duration of exposure, and similar use of controls. Then you need to choose appropriate analytical methods,

and select laboratories that can perform the analyses, review and interpret the results, and take appropriate actions based on them.

Once again modern software solutions can help, by giving you a simple platform for planning an entire sampling program, minimizing the potential for mistakes or miscommunications.

Keep the Right Perspective

We've covered a lot of ground here, and we've seen the importance of making sure your HazCom program is an active, living system that shapes all aspects of your chemical safety. That leads us to another, related point: Don't focus on simply doing what the regulations require – focus on making sure what you're doing is effective.

Sometimes at my conference talks, attendees ask me about recent OSHA inspections in which the compliance officer was not satisfied with some facet of their HazCom management. "I do HazCom training and make all of my SDSs available to employees," someone might say, "but the inspector commented that not all employees knew where to access an SDS. She also remarked that it seemed to take quite a long time to retrieve an SDS they asked for. What should I do?"

I'll usually answer that I'm glad they're asking the question, because it shows they're serious about HazCom, and their description of the situation shows they're definitely doing some

of the things they need to do. But on another level, I'll point out that the ultimate test of our HazCom management is that it actually works. We can't simply train our employees and then move on to other projects, because the real test of compliance and training effectiveness is that employees understand the training. Likewise, the whole purpose of having an SDS library is to be able to access a document quickly when we need it the most. If we have an SDS access system in place that doesn't meet that purpose, the shortcomings will become obvious pretty quickly in the event of an emergency.

Don't wait for that to happen. To return to the question of what you should do if you find yourself in a similar position as the conference attendees mentioned above, the answer is "look for a solution, and then test the solution." Have a mindset of continuous improvement instead of a mindset of just getting it done.

The truth is, we've all been guilty of the "get it done" mindset at one time or another. It would take a truly extraordinary EHS professional to avoid that perspective at all times, and I must confess I've never found such a person, and have looked pretty much everywhere, including



my own mirror. But I advise that you'll find that your system will work better and promote better engagement if you stay focused on the right things, and always look for ways to test and improve its effectiveness.

Stories of HazCom: Past and Present

Well, here we are. We're just about finished with your introduction to HazCom, and we hope that we've successfully articulated the importance of HazCom as not just a regulatory obligation, but a way to make your workplace safer. As we wrap up, I'd like to share a couple of personal stories that demonstrate this point — the point about the HazCom Standard playing a real role in affecting worker safety.

Our first story takes us back to when I was a graduate student in an environmental and occupational sciences program, and one of my program requirements was participation in a clinic program at a nearby hospital. The purpose of the program was to allow patients with health conditions linked to their work history to talk about their past and current jobs to better understand the origins of their health issues. I met many people during my participation, but there's one gentleman I've never forgotten.

His job for most of his working career was to wash greasy parts in a "dip tank," which is basically just a metal wash basin filled with solvent. Each day this man would punch in at work, and then set down by the basin with a rack full of dirty machine parts, and begin dunking them into the basin to remove the oil and grease. He'd then wipe them with a rag and set them to dry, and then repeat this multiple time per day, every day, for about 35 years.

For the majority of his time in that role, there wasn't even a HazCom Standard yet. In fact, he hadn't even known the identity of the chemical in the basin, which turned out to be toluene — a chemical that should be taken very seriously. Since he didn't know what he was working with, he also didn't know how to work with it safely. He worked every day with this chemical without proper ventilation or personal protective equipment (PPE), dunking the parts into the solvent with his bare hands and breathing in the fumes.

As a result, he had very little short-term memory. He was able to talk to us about his work history, as well as about meeting his wife, and getting married, but he couldn't remember what he'd done earlier that same morning. In fact, he couldn't seem to remember things he'd said five minutes earlier in the conversation. It also became clear that his wife, who'd accompanied him to the interview, was doubling as his caretaker.

Throughout the past 25 years, I've been haunted by that man and his story. They've underpinned and informed everything I've done in this industry since then.

Here's a second, more recent story, with a happier ending. About four years ago, there was an incident in which a worker at the end of his shift disposed of the residual chemicals in his work pails within a single "waste drum." The chemicals already in the drum, from a different waste stream, were incompatible, and they catalyzed a reaction. When an employee on the next shift reported in for work, he noticed the drum was bulging at the sides, and was looking like it might explode. He reported the observation and management made the decision to evacuate the building.

Luckily, plant personnel were able to quickly locate the SDSs for the materials involved in the reaction, and using the composition information in Section 3 and the stability and reactivity information in Section 10, were able to identify and safely contain the chemical reaction before an explosion could occur. While the incident certainly revealed problems with their hazard awareness and waste management practices, plant personnel avoided a potentially catastrophic outcome, and all of their workers made it home safely.



The difference in outcomes between these two stories is a legacy of OSHA's HazCom Standard.

We started you along your HazCom journey by telling you about the real safety benefits that have come from the HazCom Standard, and how much things have improved since the bad old days before it existed. As we send you on your way, we'd like to remind you of that.

HazCom isn't just about meeting a regulatory obligation, or avoiding a violation. It's about getting our workers home safely. Always remember that, because if you do, you might just get the perspective you need to excel at HazCom management.

Enjoy the rest of your journey – we think you've got it from here. Just keep on plugging ahead, with both eyes on the road and two hands on the wheel. And remember that everything you learn along the way will give you new perspectives that will shape your understanding of the whole journey, right back to the beginning.

**As T.S. Eliot said in the last poem
in his **Four Quartets**,**

"We shall not cease from exploration

And the end of all our exploring

Will be to arrive where we started

And know the place for the first time."



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