

## Simplifying COSHH and Improving Chemical Safety

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At Heineken UK, we have developed a set of procedures and training materials to help simplify the entire COSHH process and ensure compliance with HSE regulations. We have complete visibility of all COSHH assessments and safety data sheets through “COSHH Boards” on each of our production lines for ease of access to critical information in an emergency. We have found these procedures to drastically save time, improve COSHH assessment quality and chemical control across an entire site. The engagement and awareness of our colleagues on chemical safety has dramatically increased.

Keywords: COSHH, chemical safety, DSEAR, COSHH Board, COSHH tubes, risk assessments

### Introduction

For any operating business, it is essential that employees, contractors and members of the public are kept safe at all times. If a business does not take safety seriously, there could be innumerable consequences both on a personal, reputational and legal level. However, the fundamental concept of safety is simple – for each operation your business is undertaking, it is all about understanding risk. Risk assessments are utilised throughout all industries in order to highlight potential hazards with any task. The ultimate aim is to then reduce any significant risks to as low as reasonably practicable. The one area of risk this paper will focus on is “Control of Substances Hazardous to Health” (COSHH). COSHH is the regulatory framework which encompasses any substance with the potential to cause harm. COSHH assessments are a mandatory legal requirement to help ensure hazardous chemicals are transported, stored and used in a safe way, highlighting specific risks for any process area. The Health and Safety Executive (HSE) outline practical advice and guidance on how to approach COSHH but leave it up to individuals and businesses on best ways to implement it.

On a large production or manufacturing facility, the safe use of chemicals and upkeep of high safety standards can be a significant challenge. There are numerous instances of chemical accidents in breweries and over the last few years, the most significant involved a fatality from an ammonia leak at a Carlsberg brewery (BBC News, 2016). At Heineken, we also suffered from an ammonia leak in Manchester but luckily on a much less severe scale which was contained with no risk to the staff or the public (Stuart, Yarwood, & Dobson, 2016)

It is essential that the industry as a whole learns from these mistakes but also implements effective preventative measures to stop it happening in the first place. At Heineken UK, we have developed a set of procedures and training materials to help simplify the entire COSHH process and ensure compliance with HSE regulations. We have strived to ensure that it remains an efficient and worthwhile endeavour for businesses on their journey to a zero accident workplace.

### Project Brief

Our COSHH improvement project was initiated from issues highlighted during our internal chemical audits in Hereford. We found numerous opportunities across our site including:

A lack of chemical control with new chemicals being brought onto production lines that hadn't been risk assessed.

A lack of up to date risk assessments, some over 5 years old, and safety data sheets (SDS) tied to chemical stations which are difficult to remove in an emergency (Figure 1).

A lack of ownership of who is responsible for updating and maintaining risk assessments.

The inability to accurately determine which chemicals were in each area.

Risk assessments stored away in a folder with no visibility of potential risks, creating a lack of ownership of chemical safety.

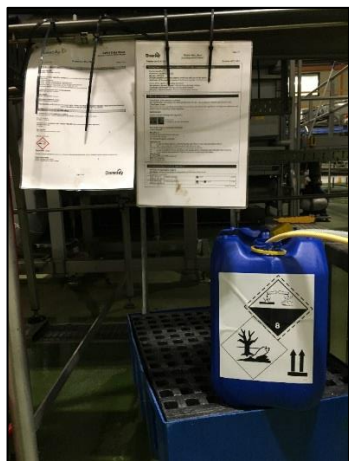


Figure 1: Example of previous SDS display with cable ties

In some of the cases above, there are clear procedures set out in the Heineken UK framework for COSHH but these were not being followed and not working as effectively as we intended. We set out to tackle the above issues and draw up a new set of procedures which we believe to be the most efficient way to operate from our experience.

## **Improved COSHH Procedures**

### **Site Chemical Control**

We started by compiling a site-wide list of all the chemicals we have onsite, broken down by area. This is our starting point for allocating resources to completing COSHH assessments. In terms of people resourcing, we have what we have coined “COSHH Champions” – individuals in each area of the site who are fully trained in COSHH and chemical safety. Their responsibilities are to oversee the COSHH process and ensure high chemical safety standards. We allocate each COSHH champion a number of risk assessments based on the chemicals in their area. With any chemicals that are used in multiple areas across the site, we make specific considerations to this within one risk assessment and again these are divided up amongst the COSHH Champions. They are responsible for liaising with the trained individuals in each area the chemical is present in order to understand any specific risks.

The site-wide chemical list is controlled through our primary chemical intake point in our material stores. If we receive any new chemicals, it is a quick check to determine if we already have a risk assessment for the chemical before transporting it to the relevant department. If a new risk assessment is required, the COSHH Champion will ensure this is completed before it is brought into a process area.

All documentation is controlled through a central online document management system. This is essentially one folder containing all our chemical inventory, including SDS and COSHH assessments. From the primary folder, the same documentation is then linked to sub-folders per department for ease of use. By controlling our chemicals and documentation this way, it minimises the risk of any new chemicals creating hazards on production lines without proper risk assessments. We have clear visibility of the chemicals in each area and so in the event of an emergency, we could give accurate information to emergency services of specific chemical hazards in that area.

### **COSHH Assessments and COSHH Board**

The next improvement we made was changing the way we conducted risk assessments and how these were displayed across our production lines. As previously mentioned, risk assessments were completed and then stored away in a folder, with a lack of visibility and emphasis on any risks associated with each chemical. Our first step was to standardise our risk assessment format by building an easy to use template. This guides the assessor through a simple step-by-step process on things to consider when conducting the risk assessment, aspects such as: task description, duration, hazards, precautions and PPE. An excerpt of this document is found in Appendix 1. This continually references the chemical SDS in order to gather all the manufacturer information on the chemical. The assessor then assigns a final risk to that chemical (high, medium, low) and if the risk is deemed high or medium, this prompts a response to find ways to reduce this risk to low.

From an employee standpoint, we have found that by using a step-by-step guide, the prospect for colleagues of risk assessing chemicals is far less daunting than it was previously. For anyone who is fully trained in COSHH, we are encouraging their participation in all aspects of COSHH to help drive standards and ensure we are safe across all areas of our sites. One issue we suffered from was that people would train in COSHH and then not actually do any risk assessments until a year or so later. By simplifying the risk assessments, we have found a drastic increase in engagement with our COSHH champions.


The next step was to redesign the way we used and display the COSHH information to colleagues interacting with these chemicals on a day-to-day basis. Our design criteria was to have a visual display and a simple way to access the information in an emergency. We needed a way to store the information in such a way that it was protected from a wet and dusty atmosphere. We came up with a concept of a “COSHH Board”:



Figure 2: An example of a COSHH Board with COSHH tubes on one of the Heineken UK production lines

Each COSHH tube attached to this board represents each chemical in that production area. Inside the tube is the COSHH assessment and SDS and each tube is labelled with the chemical name, manufacturer, document reference number and classification (acid, alkali, neutral etc.). The COSHH Board is located adjacent to the production line en route to an emergency exit. The idea is that in the event of a serious accident, a colleague can take the tube from the board with all the critical information and hand this over to emergency services. The key point is that the information is available immediately and all employees are trained in its use.

The next step we took was to use the information from the COSHH assessment and create something more functional for operators when interacting with chemicals on our production lines. As previously mentioned, we found SDS cable tied to chemical stations and these were often in poor condition, outdated and never looked at. Our design aim was to create something visual which contained the critical information from the COSHH assessment and SDS, and could be stored at the point of use for each chemical:



## Safety Essentials

### Diversey Hypofoam VF6

Chlorinated  
Alkaline











PPE	Hazards	Storage
 <p style="margin: 0;">Full Face Visor EN166</p>	 <p style="margin: 0;">Danger – can cause severe skin burns and severe or permanent damage to eyes</p>	 <p style="margin: 0;">Keep only in original, closed container</p>
 <p style="margin: 0;">Chemical Resistant Overalls EN531</p>	 <p style="margin: 0;">Corrosive to metals in concentrated form and dangerous for the environment</p>	 <p style="margin: 0;">Keep away from acids</p>
 <p style="margin: 0;">Chemical Resistant Gloves EN374</p>	 <p style="margin: 0;">Reacts with acids releasing toxic chlorine gas – keep away from acids</p>	 <p style="margin: 0;">Use only in adequate ventilation</p>
 <p style="margin: 0;">Wellington Boots EN345</p>		

Figure 3: Example of a COSHH Point of Use Safety Essentials card

We have deemed the safety essentials for day-to-day use to be: required PPE when using the chemical, the hazards associated with the chemical and the correct, safe storage of the chemical. This allows the operator to quickly check important information on each chemical before using it, with each of these cards displayed at the point of use. These are either displayed as single A6 white vinyl stickers or for areas with many chemicals, a paint wheel style design with multiple cards.

## COSHH Revisions and Maintenance

With the COSHH Board and Safety Essentials cards, this encompasses the daily interactions with chemicals and access to critical information in an emergency. We next focused on new ways in which to maintain the system and keep the COSHH assessments up to date. In terms of resources, a production line with 50 chemicals took about 3 - 5 weeks to risk assess in detail. This included looking at whether the hazardous chemicals could be substituted for a less hazardous equivalent and investigating if the chemical was still in use and required. On our Hereford site we had well over 400 chemicals which were in use across all departments and hence it is a huge effort to risk assess them all. This could be for a numerous reasons; changing chemical supplier, re-doing assessments to improve quality or most importantly, re-doing risk assessments in the event of an accident or near miss.

After the initial upheaval and time invested in completing all the risk assessments in detail, we proposed that all the hard work is done and instead it should only require minor maintenance. Very simply, we took the previous revision date of the SDS for each chemical, added three years onto that and set an expiry date for the next COSHH assessment. This is the spreadsheet you can see on the right hand side of the COSHH Board in Figure 2 and an example is shown below:


			
COSHH Risk Assessment Chemical List - Keg Line			
Please note that chemicals are listed in order of expiry date - safety data sheets used onsite MUST be within 3 years old.			
Chemical	Manufacturer	Expiry Date	MSDS URL
Sodium Hydroxide 0.1M	Fisher Chemical	26 February 2018	<a href="https://www.fishersci.co.uk/gb/en/home.html">https://www.fishersci.co.uk/gb/en/home.html</a>
Decon 90	Decon	01 June 2018	<a href="mailto:mail@decon.co.uk">mail@decon.co.uk</a>
Dri-Decon	Decon	01 June 2018	<a href="mailto:mail@decon.co.uk">mail@decon.co.uk</a>
Lactic Acid	Vickers Laboratories	06 August 2018	<a href="http://www.viclabs.co.uk/laboratories/product/lactic-acid-solution">http://www.viclabs.co.uk/laboratories/product/lactic-acid-solution</a>

Figure 4: Excerpt from the COSHH Expiry spreadsheet

So now, operators can keep track of the due date of the next COSHH assessment for each chemical and raise this with the necessary individuals if required. This also naturally staggers the risk assessments throughout a three year period instead of doing them all in one go. This expiry date also matches the one from the online document management system which will send out email prompts approaching the due date.

With the new standardised SDS format from the European Chemicals Agency (ECHA) and Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulations, Section 16 contains “Reason for revision” (ECHA, 2015) which details any changes to a new revision of a SDS. For updating a COSHH assessment, all we need to do is check if there is a new revision of a SDS – if nothing has changed in the SDS that changes the risk assessment, then effectively, the COSHH assessment will stay the same. We have made this easy by building a spreadsheet with the URL to the chemical manufacturer website or contact email which was used to obtain the SDS initially. So now, all the operators have to do is quickly check if there is a new SDS revision, audit the chemical’s use and storage and the COSHH revision is complete. This is a critical step because the chemical audit should also consider if the task has changed, any variation in engineering controls, condition of PPE etc. And again, it is critical to prompt a COSHH assessment review in the event of any accident, incident, near miss or communicated safety alert.

This has drastically decreased our resourcing to COSHH but improved our awareness and engagement in chemical safety. It has also significantly improved motivation to develop accurate and detailed risk assessments initially, because then they are very easy to maintain. COSHH now takes approximately one hour per month of monitoring instead of weeks of resourcing at a time, every three years.

## DSEAR Rated and Flammable Chemicals

Our highest risk areas of DSEAR-rated and flammable chemicals are incorporated within existing procedures. Any flammable chemicals are stored in a flammables cabinet at each location they exist onsite. With our revamp of COSHH procedures, we have tightened standards and improved visual management of each chemical. Each flammables cabinet is labelled with the chemical contents and quantity.

Our DSEAR-rated chemicals, of which the vast majority are food grade additives or ingredients, are all stored in a designated area outlined on a site map. This area is restricted to colleagues who are specifically DSEAR trained. There are no high-vis

jackets or mobile phones allowed in the area to eliminate any risk of static electricity. The room is refrigerated to less than 5°C to ensure chemicals remain well below their flash point. We have a specific DSEAR COSHH Board adjacent to this room and the risk assessment considerations are identical to the procedures outlined previously.

## Training

To supplement the aforementioned improvements, we constructed a set of training materials to lead any COSHH assessor through the process. This included:

- A risk assessment guide, outlining the process from gathering the chemical list to uploading documents and maintaining the COSHH system.
- A risk assessment template, creating a step-by-step process for the COSHH assessor to follow for each chemical.
- Example risk assessments for a variety of chemicals – acids, alkalis, flammables, toxic gases etc.
- A guide on uploading and controlling documents through the document management system.
- A sample COSHH Expiry spreadsheet and chemical list for one of our production lines.

Collating this documentation was essentially a process of lessons learned. There were aspects of the project we could have done more efficiently and faster, so we wanted to capture this. This project was initiated only on one production line so there was scope improvement for the site-wide and UK-wide rollout within Heineken UK. We wanted to try and make this transition as smooth as possible. Each COSHH Champion also went through a full day training course in order to upskill them in chemical safety and this was an essential requirement before operators were authorised to conduct risk assessments.

## Summary of Process

A simple brief summary of the process is outlined below:

1. Create a COSHH chemical database that includes all chemicals onsite broken down by area.
2. Simultaneously, assess and gather feedback on which chemicals are no longer used and can be removed, and which hazardous chemicals could be substituted for a less hazardous equivalent (this may already be a factor considered in chemical procurement, as in our case).
3. Control this list through your primary chemical intake point (this could be material stores, chemical stores, security etc.).
4. Allocate each chemical in each process area to a COSHH Champion who will then complete the risk assessment.
5. Upload the risk assessment and SDS to the central document management system, setting the revision date to 3 years after the last SDS revision date.
6. Find a suitable storage location in the desired area according to the considerations of the risk assessment.
7. Display the “Safety Essentials Card” nearby so that colleagues are aware of the required PPE, hazards and storage requirements.
8. Display risk assessment and SDS on COSHH Board in a COSHH Tube.
9. Maintain COSHH Board and necessary documentation by following the COSHH Expiry spreadsheet, following the SDS URL to check for a new revision. Revise the COSHH assessment in the event of any accident, incident or near miss.
10. The output of the COSHH assessment should also prompt the development or revision of Safe Operating Procedures (SOPs) and Safe Systems of Work (SSoW). This ensures that any trained task involving chemicals incorporates the key information from the risk assessment.

## Conclusion

At Heineken UK, we have developed a set of COSHH procedures in order to help businesses adhere to HSE regulations as well as increase awareness of chemical safety and engage operators. The process itself may be familiar to many businesses across the industry but what we believe is our best contribution is the introduction of new concepts of a COSHH Board with COSHH Tubes, ensuring ease of access to critical information in the event of an emergency. The COSHH Safety Essentials Card allows operators to quickly check PPE requirements, potential hazards and storage of each chemical, with the card on display at point of use. By displaying this information in a new and visual way, we have drastically increased engagement in chemical safety on our production lines and improved chemical storage standards. We have clear visibility on the breakdown of chemicals per production area.

After the initial upheaval of detailed risk assessments, we have significantly reduced our own resourcing to COSHH, from weeks to hours, by monitoring SDS revisions and outlining a process by which to maintain risk assessments. Utilising COSHH Champions on each production line means we have someone who is responsible for overseeing the process and ensuring high standards are sustained. We have developed training documents in order to help support this process across Heineken UK for ease of implementation across our other major sites. We are continuing to monitor the frequency at which chemical hazards are raised in order to ensure our process is working as we intend.

We have outlined these procedures in this paper with the aim of sharing some of what we believe is good practice. We hope to assist other businesses in the industry, whether their COSHH procedures are already well-established or may be looking for better and more sustainable ways to implement COSHH. We hope to gain feedback on our methods and explore any other potential improvement opportunities that exist within the industry.

## References

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HMESC: 01.40.01.713 Global Safety Standard - Safe Handling of Dangerous Substances

UK Safety Guide 8.1 General Guidance on COSHH

UK Safety Guide 19.1 Dangerous Substances and Explosive Atmospheres (DSEAR)

**Appendix 1 – Sample of Front Page of Risk Assessment Template**

		<b>COSHH Risk Assessment No: HFD-SITE-COSHH-0017</b> <b>CHEMICAL NAME</b>			CATEGORY
<b>STEP 1: Location:</b>				Department:	
<b>STEP 2: Substances Used:</b> <i>(continue on an extension below sheet if required)</i>	Supplier Details		SDS Ref	Name of Substance	Reactivity & Properties
	Company Address Postcode Country  Tel: +44 Fax: +44 Email:  Emergency Telephone Number: +44  CATEGORY (top right hand corner) – each chemical will either be: Acid – RED Alkali – BLUE Neutral – GREEN Chlorinated – BLUE & YELLOW Unclassified – NO COLOUR		SDS reference if available  Revision number Revision date  Expiry – date	NAME	List properties such as: Colour, chemical type (aerosol, lubricant etc), flammability conditions to avoid/hazardous reactions and pH = if available.  Section 9 and 10 of SDS  This ensures we do not store a material in hazardous conditions or near potentially reactive chemicals.
<b>STEP 3: Task Description -</b> Describe the activity or work process. Location of process being carried out?		How the chemical is used, what for and where? The more detail the better! If we understand the purpose of the chemical then this will avoid improper use.  Location is important because a chemical will have a different risk profile if you are directly exposed to it compared to it being contained within the line, for example.			
<b>STEP 4: Duration –</b> Describe how long the task takes and many times per day/week/month. Also describe the quantity used.		How often you are using a chemical will directly affect risk since there are more chances for you to be exposed.  What type of container is used to store the chemical and then what quantity is used to carry out the task?			
<b>STEP 5: People at Risk -</b> Identify the persons at risk and number exposed?		Employees <input type="checkbox"/>	Contractors <input type="text" value="Varies"/>	Visitors <input type="text" value="0"/>	
<b>STEP 6: Classification (state the category of hazard) Refer to Section 8.1 of UK Safety Manual – Appendix 3</b>					
 <input type="checkbox"/> Corrosive		 <input type="checkbox"/> Serious Health Hazard		 <input type="checkbox"/> Flammable	
 <input type="checkbox"/> Acute toxicity		 <input type="checkbox"/> Gas under Pressure		 <input type="checkbox"/> Oxidising	
 <input type="checkbox"/> Health Hazard		 <input type="checkbox"/> Explosive		 <input type="checkbox"/> Dangerous for the environment	