Kent County Council are legally required to provide a working environment which is safe and without risk to health. This includes identifying and managing ways of working safely within confined spaces.

**Scope**
A confined space is a workplace which, through a combination of substances or conditions, is substantially (but not always entirely) enclosed, resulting in an increased risk to the safety or health of people.  These workplaces may contain flammable substances, toxic gases, fumes, vapours, or limited oxygen. They may contain solid materials that flow or be subject to excessive heat or ingress by liquids.

A confined space can be defined as any space of an enclosed nature where there is a risk of death or serious injury from hazardous substances or dangerous conditions (e.g., lack of oxygen). It can include ductwork, unventilated or poorly ventilated rooms.

**The why, what and how**

KCC are required to manage the risks of entering a confined space by carrying out a risk assessment to identify the hazards and put in place a safe system of work designed to avoid injury and ill health.

Where it is not reasonably practicable to avoid entering a confined space to carry out work, the employer or self-employed person is responsible for ensuring that a safe system of work is used.

**Examples of a confined space**

While some confined spaces are fairly easy to identify – such as enclosures with limited openings - some are less obvious. They include:

* storage tanks
* silos
* reaction vessels
* enclosed drains
* sewers
* open topped chambers
* vats
* combustion chambers and furnaces
* ductwork
* unventilated or poorly ventilated rooms.

This list is not comprehensive. Some places may become confined spaces when work is carried out or during their construction, fabrication, or subsequent modification.

**Risks from confined spaces**

Risks can arise in confined spaces because of:

* a lack of oxygen.

This can occur:

When there is a reaction between some solids and a reaction in the atmosphere following the action of groundwater or chalk and limestone which can produce carbon monoxide and displace normal air.

Inside steel tanks and vessels as a result of rust forming.

* poisonous gases, fumes, or vapour.

These can:

* build-up in sewers and in pits connected to the system
* enter tanks or vessels from connecting pipes
* leak into trenches and pits on contaminated land such as old refuse tips and old gas works
* the unexpected ingress of liquids and solids.

These can suddenly fill the space or release gas into it when disturbed. Free flowing solids such as grain can also partially solidify and make a ‘bridge’ in silos which can then collapse unexpectedly and cause a blockage or other danger.

* fire and explosions (e.g., from flammable vapours, excess oxygen etc.)
* gas, fumes, or vapour given off from residue in a tank or other vessel or remaining internal surfaces
* dust in high concentrations, such as in flour silos
* hot conditions which can cause a dangerous increase in body temperature.

While some of the above conditions may already exist in the confined space, some may arise through other work being done or be caused by ineffective plant. The fact that work is being done in a confined space may increase the dangers that would normally accompany the work being carried out. As an example, machinery being used in such an area may require special precautions such as providing a dust extractor for a portable grinder. Gas, fumes, or vapour can be caused by welding or by using volatile, flammable solvents etc.

**Preventing the need to enter a confined space**

KCC are required to prevent employees and others under our control, such as contractors, from entering confined spaces where it is reasonably practicable to carry out the work without entering the confined space.

Consider whether work could be done from outside using appropriate equipment tools, or cameras? Could blockages be cleared using vibration or air purger tools?

You should be able to identify whether or not this is possible once you have undertaken a risk assessment. If you cannot avoid entering a confined space, you will then need to set up a safe system of work.

Advice about entering confined spaces should be sought from the Health and Safety Team via healthandsafety@kent.gov.uk

Further guidance on carrying out risk assessments, setting up safe systems of work and permits to work are detailed in Frequently Asked Questions.

**Frequently Asked Questions**

**How do I carry out a risk assessment?**

You must carry out a risk assessment before work is permitted in a confined space. This means identifying the hazards present, assessing the risks and determining what precautions to take. If there is no way of avoiding the need to enter a confined space, then you will need to set up a safe system of work.

Managers who have a responsibility for undertaking risk assessments can follow the basic procedure contained in the risk assessment topic on Knet & KELSI Your assessment must consider considering the following:

* the task
* the working environment
* working materials and tools
* suitability of those carrying out tasks
* emergency arrangements
* the general condition of the confined space
* what might be, or not be present (i.e., lack of oxygen)
* previous contents and hazards expected
* residues - dangers that may exist
* contamination from adjacent plant
* physical dimensions
* cleaning chemicals - those that might be used
* sources of ignition
* ingress of substances - liquids, gases, etc.

In confined spaces, a greater competency than normal may be needed for entry.

**What is a ‘permit–to–work system and when is it necessary?**

A permit-to-work is a formal check to ensure all the elements of a safe system of work are in place. This must be completed and signed off before people are allowed to enter or work in a dangerous environment such as a confined space. It is also a means of communication between site managers, supervisors and those carrying out the work. Further details on permit to work systems please refer to guidance on Knet/Kelsi.

**When and how do I put in place a safe system of work?**

If you cannot avoid the need for workers to enter a confined space, you must make sure you have a safe system for working inside the space. Use the results of your risk assessment to help identify the precautions you need to take to reduce the risk of injury or ill health.

Ensure that the safe system of work including all the precautions are put into practice before work commences. Everyone involved will need to be properly trained and instructed to make sure that they know what to do and how to do it safely.

The following are essential elements of a safe system of work:

* Supervision - the degree of supervision should be based on the findings of the risk assessment.
* Competence for confined spaces working – it is essential that individuals have adequate training and experience in the particular area of work involved.
* Communications - an adequate communication system is needed to enable communication between people inside and outside the confined space and to make sure help can be summoned in an emergency.
* Limiting working time - there may be a need to limit the time period that individuals are allowed to work in a confined space.
* Testing/monitoring the atmosphere - the atmosphere within a confined space may need testing for hazardous gases, fumes, or vapour or to check the concentration of oxygen prior to entry.
* Gas purging - where the risk assessment has identified the presence, or possible presence, of flammable or toxic gases or vapours, there may be a need to purge the gas or vapour from the confined space.
* Ventilation - some confined spaces are so enclosed that they require mechanical ventilation to provide sufficient fresh air to replace the oxygen that is being used up by people working in the space and to dilute and remove any gas, fumes or vapour produced by the work.
* Removing residues - cleaning or removing residues is often the purpose of work in a confined space.
* Isolation from gases, liquids and other flowing materials – confined spaces will often need to be isolated so that substances that could pose a risk to those working within the space cannot enter.
* Isolation from mechanical and electrical equipment - some confined spaces contain electrical and mechanical equipment powered from an outside supply.
* Gas supplied by pipes and hoses - the use of pipes and hoses to supply oxygen or flammable gases into a confined space should be controlled to minimise the risks.
* Access and egress - you should provide a safe way in and out of the confined space. Check the size of the entrance. Is it big enough to allow workers wearing all the necessary protective clothing to climb in and out easily and to provide ready access in an emergency?
* Fire prevention - wherever possible, flammable and combustible materials should not be stored in confined spaces that have not been specifically created or allocated for that purpose.  Suitable firefighting equipment should be provided (together with the training necessary for it to be used).
* Portable gas cylinders and internal combustion engines - never use petrol or diesel-fuelled internal combustion engines in confined spaces.
* Lighting - adequate and suitable lighting, including emergency lighting, should be provided.
* Static electricity – prevent any risk of static discharge, and exclude all sources of ignition, if there is a risk of a flammable or explosive atmosphere in a confined space.
* Special tools – non-sparking tools and protected lighting are essential where flammable or potentially explosive atmospheres are likely.
* Smoking - smoking should be prohibited in confined spaces.
* Selecting and using suitable equipment - equipment provided for use in a confined space needs to be suitable for the purpose.
* Personal protective equipment and respiratory protective equipment - as far as is reasonably practicable, you should ensure that a confined space is safe to work in without the need for personal protective equipment (PPE) and respiratory protective equipment (RPE). This should be a last resort, except when it is needed for rescue work (including the work of the emergency services).
* Emergencies and rescue - the arrangements for rescuing people in the event of an emergency need to be suitable and sufficient. Where appropriate you will need to provide the necessary equipment to enable resuscitation procedures to be carried out. Preparation for emergency arrangements should include testing equipment and carrying out training and practice drills.
* Capabilities of rescuers – rescuers need to be properly trained, fit enough to carry out their task, ready at hand and able to use any of the equipment provided and needed to carry out the rescue. Rescuers also need to be protected against the cause of the emergency and the dangers posed by the confined space.
* Shutdown - it may be necessary to shut down any adjacent plant before attempting an emergency rescue.
* Provision of a rescue harness - lifelines attached to harnesses should run back to a point outside the confined space.
* Method of raising the alarm – does someone need to be stationed outside to keep watch and to communicate with those inside, to raise the alarm quickly in an emergency and take care of rescue procedures?
* First aid procedures – trained first aiders need to be available to make proper use of any first aid equipment.
* Local emergency services – how are the local emergency services made aware of an incident? What information about the dangers of the confined space will you give them on their arrival?

A management checklist for confined space work activities is available to download from Knet & KELSI.