Assessing and controlling the risk of fire and explosion at sites where petrol is stored and dispensed as a fuel
Assessing and controlling the risk of fire and explosion at sites where petrol is stored and dispensed as a fuel
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>ix</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>The hazard from petrol</td>
<td>3</td>
</tr>
<tr>
<td>General principles of risk assessment for the storage and dispensing of petrol</td>
<td>5</td>
</tr>
<tr>
<td>Five steps for assessing the risks and identifying essential measures to control the hazard</td>
<td>8</td>
</tr>
<tr>
<td>Appendix 1 Systems of work</td>
<td>37</td>
</tr>
<tr>
<td>Appendix 2 Training</td>
<td>39</td>
</tr>
<tr>
<td>Appendix 3 Risk assessment examples</td>
<td>41</td>
</tr>
<tr>
<td>Appendix 4 Relevant legislation</td>
<td>52</td>
</tr>
<tr>
<td>Appendix 5 Other sources of advice and further reading</td>
<td>54</td>
</tr>
<tr>
<td>Appendix 6 Glossary of terms</td>
<td>55</td>
</tr>
<tr>
<td>Appendix 7 Acknowledgements</td>
<td>58</td>
</tr>
</tbody>
</table>
This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Petroleum Licensing Officers seek to secure compliance with the law and may refer to this guidance as illustrating good practice.
The aim of this guidance is to help those responsible for safety at sites where petrol is stored and dispensed to meet their obligations under health and safety law. It should simplify the task of assessing and controlling risks at such sites and help in securing a consistent approach to risk assessment and enforcement throughout the industry.

The guidance has been developed with the assistance of the petroleum industry and petroleum licensing authorities, whose considerable efforts are much appreciated.

Where references to British or other standards are made in this document, equivalent standards which are not specifically referred to but which may exist or may be developed are equally acceptable alternatives.
INTRODUCTION

1 This publication provides guidance on:

- assessing the risks, and
- identifying the necessary control measures

for the safe operation of sites where petrol is stored and dispensed for use as fuel for motor vehicles and similar machinery. It sets out the steps to be taken to control the risk of fire and explosion. The guidance is aimed at those responsible for such sites and local authority Petroleum Officers.

2 The guidance applies to petrol filling-stations, farms, commercial goods vehicle depots, private businesses, marinas, stately homes and other premises where petrol is kept as a fuel. It applies to new and existing sites. The guidance may also be relevant to diesel fuel where it is stored with petrol.

3 It is a legal requirement under health and safety law that those responsible for such sites ensure that risks are adequately identified, assessed and controlled. When assessing risk, common sense is often all that is necessary. But remember, the balance must be firmly on the side of safety, and the assessment and control of risks is a continuous process. Measures must be taken to eliminate or control the risks unless it is clear that the cost of doing so is grossly disproportionate to the level of risk. However, the ability to pay for additional control measures is not a deciding factor as to whether they are necessary. Where it is not possible to remove the risk then the arrangements for managing the site safely are particularly important. In this respect Appendix 1 (Systems of work) and Appendix 2 (Training) contain essential advice.

4 This guidance is not prescriptive. It seeks to make those people responsible for sites aware of the hazards from their operations and enable them, in line with their legal obligations, to adopt a practice of identifying, assessing and controlling risks. With the large number of sites involved, considerable variation in equipment, site design, systems and work practices exists. The contents of this publication can only be used as guidance and the reader will need to use discretion where the guidance does not match the exact circumstances of the site. Wherever possible, appropriate established good practice should be followed.
Where it is necessary to vary normal industry practice then a more detailed risk assessment may have to be carried out. The introduction of new or additional control measures is not necessary if the only purpose is to modernise the site or if the control measures are excessive in proportion to the level of risk.

Guidance on specific safety issues is provided from time to time by Petroleum Licensing Authorities and the Health and Safety Executive (HSE). Although not considered here, other issues such as risks to health, including the dangers of being overcome by petrol fumes, violence against employees, and environmental protection, may also need to be addressed by those responsible for sites.

Specific technical guidance covering the building of a new site, or a major redevelopment, is being produced by the petroleum industry. Appendix 5 Other sources of advice and further reading points to other guidance of which you will need to be aware.

This guidance refers throughout to ‘hazard’ and ‘risk’. ‘Hazard’ means anything that can cause harm. ‘Risk’ is the chance, great or small, that someone, either on or off the site, will be harmed by the hazard.

Your Petroleum Officer (see Appendix 6) can provide advice and needs to be approached at the earliest possible stage to discuss any concerns you have, or any improvements or alterations you intend to make to your site.

THE HAZARD FROM PETROL

This guidance looks at fire and explosion hazards. In this respect petrol has the following characteristics:

- It gives off a flammable vapour. When this vapour is mixed with air in certain proportions a risk of fire or explosion exists. As little as 1% of vapour in air can create a flammable atmosphere;
- The vapour is heavier than air and does not disperse easily in still air conditions. It tends to sink to the lowest possible level of its surroundings and may accumulate in tanks, cavities, drains, pits or other depressions;
- It floats on the surface of water and may, along with its vapours, be carried for long distances from the initial source by water courses, sewers, ducts, drains or groundwater.

Petrol vapour, even when present in the atmosphere at relatively low levels, can be harmful if inhaled. In addition, frequent contact with the liquid may pose other health hazards. This guidance does not deal with these risks which should be considered in the assessment required under the Control of Substances Hazardous to Health Regulations 1994 (COSHH).

Environmental protection requirements are increasingly influencing equipment standards and site design. Environmental hazards are not dealt with in this publication. However, a risk assessment covering these issues may also need to be carried out. Safety measures for containment of petrol not only help prevent fire and explosion but also have the benefit of preventing contamination of the air, land and waterways. Any additional control measures introduced to protect the environment should not compromise safety. There is specific legislation and guidance covering vapour recovery requirements, details of which are available from the Department of the Environment.
55 homes evacuated

A petrol filling-station on a major urban ring road had sales in excess of 5 million litres per year.

The first signs of problems were a small leak of petrol in neighbouring houses, eventually up to 35 homes were affected. Houses were evacuated at the front but the petrol was also found in a river and the mains became contaminated.

The tanks and lines were tested for leaks but found to be sound. The site was closed to large amounts of petrol were discovered in the ground under the site.

Investigation revealed that the equipment had not failed, but the lack of proper operating procedures had been the problem. One of the tanks at the site was small and in each delivery the tank was filled to the top and petrol regularly splashed to the manhole. This practice resulted in this incident where closed the filling-station, put neighbours in danger and required the operator to repair some and remediate of the site.

The incident would not have occurred if the operator had followed the correct procedure. The amount of petrol the tank could safely receive. While not the only solution, the filling of an overall prevention-device would have prevented this.

Grandmother killed in her own kitchen

Petrol was purchased from a self-service petrol station by a young man for his motorcycle, in a can which had previously been used for cooking oil. The can, which had been part used to fill the motorcycle, had been left in a cupboard.

The young man’s grandmother was walking towards closing the cooking oil can, attempted to put it in the kitchen for drying. The resulting fire killed her and burnt down the house.

The incident could have been avoided by the close operator at the petrol station only allowing the young man to fill up an authorized, clearly labelled petrol container.

Explosion kills contractor

A contractor was called to a petrol station which was to be closed and the tanks were reported to have been made safe by filling with water. He was asked to remove the pumps and oil pipes and to arrange for the tanks to be filled in with concrete.

While carrying out his work, he found difficulty in removing the tank lids and sent a look-out to take out the balls. An explosion occurred killing the contractor and blowing off the lid; the tanks had not been stored filled and were full of petrol vapour.

The site operator and the contractor had not considered a safe operating procedure to check that the tank was safe nor had they evaluated the risks arising from handling the disposed petrol tanks safe.

Block of flats evacuated when petrol discovered in basement

A petrol station in an urban area leaked petrol into the basement boiler house of a nearby block of flats. The caretaker discovered the petrol coming into the basement before the vapour had built up to a dangerous level. The sources of ignition were removed and the flats evacuated.

The tanks installed at the petrol station were over 50 years old and found to be leaking.

An evaluation of the risk of old tanks leaking should have been made and a tank testing programme, combined with stock monitoring, could have found the fault in the installation before it became a risk to the public.

CASE STUDIES

Grandmother killed in her own kitchen

Petrol was purchased from a self-service petrol station by a young man for his motorcycle, in a can which had previously been used for cooking oil. The can, which had been part used to fill the motorcycle, had been left in a cupboard.

The young man’s grandmother was walking towards closing the cooking oil can, attempted to put it in the kitchen for drying. The resulting fire killed her and burnt down the house.

The incident could have been avoided by the close operator at the petrol station only allowing the young man to fill up an authorized, clearly labelled petrol container.

Explosion kills contractor

A contractor was called to a petrol station which was to be closed and the tanks were reported to have been made safe by filling with water. He was asked to remove the pumps and oil pipes and to arrange for the tanks to be filled in with concrete.

While carrying out his work, he found difficulty in removing the tank lids and sent a look-out to take out the balls. An explosion occurred killing the contractor and blowing off the lid; the tanks had not been stored filled and were full of petrol vapour.

The site operator and the contractor had not considered a safe operating procedure to check that the tank was safe nor had they evaluated the risks arising from handling the disposed petrol tanks safe.

Block of flats evacuated when petrol discovered in basement

A petrol station in an urban area leaked petrol into the basement boiler house of a nearby block of flats. The caretaker discovered the petrol coming into the basement before the vapour had built up to a dangerous level. The sources of ignition were removed and the flats evacuated.

The tanks installed at the petrol station were over 50 years old and found to be leaking.

An evaluation of the risk of old tanks leaking should have been made and a tank testing programme, combined with stock monitoring, could have found the fault in the installation before it became a risk to the public.

GENERAL PRINCIPLES OF RISK ASSESSMENT FOR THE STORAGE AND DISPENSING OF PETROL

12 The concern is that petrol, or its vapour, may come into contact with a source of ignition. The control of ignition sources may become more difficult (and the potential for an incident greater) on sites where the public have access, where there are other activities apart from dispensing petrol or where supervision is not constant.

13 Factors that affect the level of the risk, ie the chance that someone will be harmed, and therefore the controls required, include:

- frequency and method of delivery;
- storage capacity and method;
- volume dispensed (throughput);
- location of the site, in particular proximity to occupied buildings, underground railways or roads, basements etc;
- number of employees and members of the public who may be in, or around, the site;
- training and competence of site operatives;
- age and type of equipment and whether self-service, attendant operated or unattended;
- layout of the site in relation to other site activities, including workshops, paint spraying, car valeting, shops, restaurants etc;
- site-specific factors, eg ground conditions, water courses and drainage systems which may affect the spread of escaped petrol.
**Example of the need to cater for the public**

A petrol filling-station was built with a large convenience store. This serves the passing motorist and the local housing estate. The store is particularly busy in the afternoons serving children from a nearby school.

In the design process, the developer had to consider the problems that this was likely to entail:

- The route for pedestrian customers entering the petrol station; whether it could be dangerous for them; or whether they would create a hazard themselves;
- The control of a number of activities on the site in addition to dispensing petrol.

In this case the measures chosen to deal with the problem included pedestrian access wide enough to take prams, located away from the road tanker off-loading area and the main vehicle thoroughfare. The developer also designed the shopping area with check-outs next to the console controlling the petrol dispensers. A series of tills and dispenser controllers were linked so that the number of staff could be increased when the site was busy.

14 The key precautions to prevent fire and explosion are:

- effective containment of petrol;
- spillage prevention, in particular during delivery and dispensing;
- effective management of expected or unexpected releases of petrol or vapour;
- keeping ignition sources away from petrol or its vapour;
- effective training for managers and staff (see Appendix 2);
- adequate supervision of staff;
- appropriate consultation with staff;
- adequate supervision of members of the public, contractors and other site visitors;
- early identification and response to changes in the vicinity of the site which may affect safety, eg building of a new road/railway or changes in the use of adjoining properties.

15 Systems of work which are properly thought through, recorded and followed, will go a long way to avoiding incidents. In particular, systems to respond effectively to incidents are of paramount importance. Procedures should be laid down for dealing with incidents during delivery or dispensing, and also for identifying and dealing with any apparent loss of stored petrol. Appendix 1 provides further guidance on systems of work.
FIVE STEPS FOR ASSESSING THE RISKS AND IDENTIFYING ESSENTIAL MEASURES TO CONTROL THE HAZARD

16 Risk assessment is nothing more than a careful examination of what, in your work activity, could cause harm to people, so that you can weigh up whether you have already taken enough precautions, or should do more to prevent harm.

17 If a risk assessment has not been completed for your site you will need to do one. If one has been done it would be sensible to use this guidance to check that all the relevant areas have been addressed. In either case you should undertake a re-assessment when there has been a significant change affecting the site or there is some reason to suspect that the original assessment is no longer valid. However, it is a good idea to carry out a re-assessment on a regular basis.

18 The following steps provide a systematic approach to looking for the hazards and managing the risks:

**STEP 1** asks you to take a fresh look at your site, its design, operation and surroundings, and identify where a fire and explosion hazard may exist.

**STEP 2** asks that for each area of the site and operation you consider what could go wrong, and who could be affected.

**STEP 3** asks you to address your findings from Step 2 and decide if the precautions are enough to guard against anything going wrong or if more should be done.

**STEP 4** deals with recording your findings.

**STEP 5** asks you to consider when you will need to review your risk assessment.

To assist you in completing Steps 1, 2 and 3 of the 'five steps' process, a suggested method is given for identifying the main areas of concern and some of the options for controlling them (see paragraph 30).

**Familiarise yourself with all five steps before carrying out your own risk assessment.**

19 Before carrying out a risk assessment you will need to have sufficient information for the purpose. HSE and industry bodies provide guidance on specific topics and your local Petroleum Officer can also provide advice. People working at the site are a good source of information and may be able to point out areas of concern, and provide practical suggestions for controls. Where there is an official Safety Representative he or she should also be consulted. Appendix 5 lists other sources of advice to help you. If you do not fully understand what is involved, you may wish to seek help (from a competent person, see Appendix 6) for all or part of the assessment.

20 You will need to familiarise yourself with the site, its surroundings and the age, make and type of equipment installed. Your local Petroleum Officer may be able to provide this information if you are unsure. A site plan showing the arrangements underground will be useful, as will one showing any drainage or conduit systems which lead off the site. Find out what the surrounding buildings are used for and whether they have cellars. Could their location and use present an ignition source or otherwise put occupants at risk? Residential accommodation including dwellings, residential homes, hospitals etc present particular problems as evacuation in the event of an emergency may take longer. The same may be true of nearby schools, office blocks, cinemas etc.

21 Identify and give careful consideration to areas where flammable concentrations of petrol vapour may be present. These hazardous areas are usually called 'zones'. Zones are classified into three types depending on the likelihood of vapour being present. The specification for electrical equipment may vary depending on the particular zone. Areas outside these zones are defined as being non-hazardous during normal operations because of the low level of flammable vapours present. For hazardous areas, more control is needed over ignition sources, which may be introduced by work being done on the site or by members of the public.

22 Each site is different and a systematic approach should be adopted. One way to do this is to follow the path of the product starting with its delivery through to the dispensing operation. The areas to be addressed include:

- delivery area and vapour venting systems, including tanker access/exit and parking;
- storage systems;
- pipework to and from tanks;
- dispensers, including access and exit for vehicles and supervision points;
- other site activities;
- off-site activities.

23 Do not disregard what you cannot see. For example, the delivery point may not be near the storage facility (i.e., off-set fill), connecting pipework may be underground and not visible, but nevertheless they could present a hazard. Petrol leaking from above-ground storage should normally be obvious, whereas underground leaks can go undetected for some time, particularly if stock levels are not monitored properly.

**STEP 2** **DECIDE ON WHAT COULD GO WRONG AND WHO MIGHT BE HARMED**

24 For each area look at the operations involved, decide how petrol could escape and identify possible sources of ignition. Consider the amount of petrol that could be split or leaked and the route it might take, and where it might collect. Ask yourself what could go wrong and who would be affected. Ask “what if this or that happened?”, take account of human error and the fact that people do not always follow instructions or behave in a responsible way. List your findings and the measures that are already in place to deal with the hazard.

**Example of how people do not always follow instructions**

Contractors were carrying out alterations to delivery pipe work at a site. A road tanker delivered 5000 litres of petrol into the off-set fill pipe of a tank on site. The contractors had disconnected this pipe and the entire delivery went into the ground, and via a culvert into a large lake used for recreational purposes.

The public were put at a high risk and the environment was affected, resulting in adverse publicity and a high-cost clean-up operation.

This incident could have been avoided by a work plan to ensure that a procedure was in place for any deliveries to be carried out safely or avoided until the alteration was completed.

25 Think about the number of people who could be affected by a fire or explosion. Include in your calculation those who work at or use the petrol dispensing facilities, people who attend the site for other reasons, shop customers, car repairs, car sales, maintenance staff, contractors etc. Include people off-site such as occupants of adjacent buildings or those further away if there is the possibility that escaping petrol could travel some distance, eg down slopes, through drainage systems, cable ducting etc. Consider the worst that could happen, ie the greatest number of people likely to be involved (especially at peak periods) and the worst incident.
Example of how petrol can travel some distance off a site

Petrol had leaked from an underground storage tank into the surface water drainage system over several years. Eventually the petrol made its way, via the water drainage system, into the cellar of a house nearby. Petrol vapour levels in the cellar were such that the risk of explosion was high and the property had to be evacuated. The ground around the tank was contaminated with petrol as was the ground around the drainage pipes stretching from the site, under the main road and to the affected property, and beyond. A total area of some 20 000 m² metres was affected.

Clean-up work ran to £250 000. The owners of the house were left with a property which was virtually worthless. Vapour levels in the cellar remained dangerous for some time and vapour build-up returned with increases in the surrounding water levels. Other house owners in the contaminated area also found the value of their properties dwindled and could not renew their insurance policies.

Checks of the amount of petrol dispensed compared to the amount delivered would have given early warning of the leak and action could have been taken to stop the escape.

WATCH OUT!

While not exhaustive, this list is typical of what can happen on sites and should be considered when asking what if this or that happened:

- People smoking on site, in and outside vehicles;
- Filling inappropriate containers with petrol;
- Parked vehicles on site, obstructing escape routes;
- Cutting grass with an electric or power mower, within the hazardous area;
- Overstretching of dispenser hoses through bad parking;
- Incorrect stowage of dispenser nozzle;
- Leaving engine running while filling up;
- Using a mobile phone or other electrical equipment while dispensing petrol;
- Rubbish left on site causing a fire hazard;
- Children playing in or around the dispensing area;
- Contractors working without proper safety protection of working area;
- Contractors working adjacent to the site without due care of hazardous areas;
- Inadequate maintenance of site and equipment;
- Under-age people dispensing petrol.
**STEP 3** EVALUATE THE RISK ARISING FROM THE HAZARD AND DECIDE WHETHER EXISTING SAFEGUARDS ARE ADEQUATE OR MORE SHOULD BE DONE

26 For each area where fire or explosion hazards may exist, consider the precautions already in place. Think about the likelihood of something going wrong and what the consequences could be. Remember that a small hazard could present a ‘knock-on effect’ and create a larger problem.

27 Ask yourself whether you have done all that the law requires you to do. Are you meeting generally accepted industry standards? The list of recommended further reading in Appendix 5 may help. But don’t stop there - think for yourself, because the law says that you must do what is reasonably practicable to keep your work place safe.

28 Your aim should be to control the risks by adding more precautions if necessary. Ask yourself two questions:

(a) Can I get rid of the hazard altogether?
(b) If not, how can I control the risks so that harm is unlikely?

29 If you share a site, tell other occupants about any risks your work could cause to them and what precautions you are taking. Think about the possible hazards created by those people sharing your site.

30 While there is no general formula for rating risks, the following section offers a method to assist in decision making. It is not a comprehensive assessment method. In using it, you will also need to weigh up the likelihood of something going wrong and the number of people who could potentially be harmed. All of these factors will vary with the site.

31 The following section looks in turn at the main elements of a site:

- Delivery and venting (page 17)
- Storage (page 21)
- Pipework systems (page 25)
- Dispensing (page 29)

It also identifies the key concerns and gives examples of the different control measures to consider. It should only be used as part of the ‘five step’ process and will not cover all situations but may help in identifying the main areas to be considered.

32 For each element you are asked to consider the general potential for harm at the site. This provides a weighting factor, which is combined with the scores given to each element of the operation. The scoring system is designed to indicate the main areas which need to be addressed. Sites differ and the scoring system cannot cover every type of situation, and cannot be taken as a precise reflection of the degree of hazard or risk. It may help, however, to establish priorities. From the total score calculated for each element, you can consider control measures from the examples provided. However, the lists are not exhaustive. There may be other site operations that you will need to consider and other types of equipment, work systems and control measures not listed here. You will need to use your judgement in deciding what is necessary and feasible for the particular site and its circumstances. When in doubt, you should seek further advice.

33 When selecting scoring elements, if there is doubt over which one to choose because a variety of situations or equipment exists, you may need to assess each situation/piece of equipment separately (eg more than one fill point in different locations, two or more tanks of different age and construction, or several lines of varying age and construction).
34 When selecting control measures it will be necessary to consider what can be done in the light of the circumstances on site. Where a hazard can be eliminated by changing the physical layout of a site, this may remove the need for further action. However, it is not always necessary or possible to achieve the ideal. Provided the *appropriate* controls are in place it is possible to run even a high hazard site safely. The Tables (pages 19, 23, 27 and 31) give some examples of options from which you may select *one or more* measures to control the hazards and risks identified from your assessment. You should start by looking at the controls that match the rating for each element of the site. Consider those which are reasonably practicable to achieve. It may be that you cannot put in place any of the example control measures for the rating for your site, but you may still be able to achieve adequate control by using those from another group or by introducing *suitable systems of work* (see Appendix 1). There may also be other control measures not listed in the tables. If you are not confident, get help from a competent source. But remember - you are responsible for seeing that the risk assessment is adequately done.

35 Appendix 3 gives examples of how this approach has been applied to three different types of site.
DElIVERY (and venting)

36 This element deals with the delivery area of the site, the delivery process itself and access by tankers, and includes example control measures for venting of tanks during deliveries.

Weighting factor

The first task is to determine the individual characteristics of the site. Consider the following descriptors and select the one which applies to your site. Then multiply your total score from the next section by the factor shown.

(a) A site with a throughput of more than 5 million litres per year* OR over 100 people at any one time within the area potentially affected by the delivery operation**: Motorway service areas, hypermarket sites and sites in built-up areas of cities or large towns would usually fall into this category.

MULTIPLY TOTAL SCORE FOR DELIVERY BY A WEIGHTING FACTOR OF 5.

(b) A site with a throughput of between 500,000 and 5 million litres per year* OR between 10 and 100 people at any one point in time within the area potentially affected by the delivery operation**: Average-size service stations and some non-retail sites in towns and suburban areas would usually fall into this category.

MULTIPLY TOTAL SCORE FOR DELIVERY BY A WEIGHTING FACTOR OF 3.

(c) A site with a throughput of less than 500,000 litres per year* OR less than 10 people at any one time within the area potentially affected by the delivery operation**: Small rural filling-stations, farm sites, stately homes and some other non-retail facilities not in built-up areas, may fall into this category.

MULTIPLY TOTAL SCORE FOR DELIVERY BY A WEIGHTING FACTOR OF 1

* When calculating the throughput of the site the most recently completed twelve-month period should be used. For sites in the design stage this figure should be based on the projected volume of the site when fully established.

** When calculating the number of people potentially affected (see also paragraph 25), as a rough guide you should include people in buildings up to 12 metres from the delivery area, including the tanker stand and areas where the tanker has to manoeuvre; and a minimum of 30 metres distance for those not protected by a building. Where spill petrol can travel some distance off-site, more people could be affected. Don’t forget to include such things as pedestrians visiting a busy site shop and/or residential accommodation above or in the vicinity of the delivery area. Count the maximum number of people that could be affected at times when deliveries usually take place. For example, normal pedestrian traffic within 30 metres of the delivery area of a site is approximately eight people. However, this figure increases in the afternoon to around 50 when customers queue for sessions in a bingo hall nearby. As deliveries take place in the afternoon and those in the queue are in an area where they could be affected, the higher figure should be used.

---

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of the fill points (Don’t forget to include any off-set fill)</td>
<td>- Fill point located within a building</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>- Fill point located within approximately 4 metres of a public thoroughfare (pavements, short cuts, paths etc)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>- Fill point located within 6 metres of a building (12 metres if residential accommodation) which has doors, windows or other openings or is not suitably protected to allow at least half an hour or more for escape</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>- Fill point located more than 6 metres from a building (12 metres if residential accommodation) or within 6 metres of a building which has no doors, windows or other openings or is suitably protected to allow at least half an hour or more for escape</td>
<td>1</td>
</tr>
<tr>
<td>Tanker access/exit (including the road tanker standing area)</td>
<td>- Tanker wholly on site when unloading but able to drive on, and off site without reversing</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>- Tanker wholly on site when unloading and driver able to drive on, and off site without reversing</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>- Tanker wholly on site when unloading but has to reverse or manoeuvre within the site</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>- Entry and/or exit to the site is difficult for the tanker</td>
<td>3</td>
</tr>
<tr>
<td>Site features in respect of spillage</td>
<td>- Spill readily escapes from site to area where it may be a danger to people</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>- Spill escapes to place where it will not present a danger to people</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>- Spill retained in drainage system on site</td>
<td>1</td>
</tr>
</tbody>
</table>

Weighing factor from previous page is (.....) X total for all three aspects (.....) = (.....)

Overall rating:

<table>
<thead>
<tr>
<th>Increasing hazard</th>
<th>Group A: 3-10 points</th>
<th>Group B: 11-24 points</th>
<th>Group C: 25-60 points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SELECTING TANKER LOCATION

**EXAMPLE DELIVERY AND VENTING**

The following are control measures normally required at all sites:

**DELIVERY**

- Adequate illumination for fill area for safe working and security;
- Maintenance of interceptor (where applicable) including frequent removal of spillage and its safe disposal;
- Work systems plus emergency procedures;
- Training of competent persons on work systems, including off-loading procedures;
- Equipment provided to include, for example:
  - sand or other means to contain spill;
  - fire extinguishers;
- Fill-pipe connections should be clearly marked to show to which tank they relate (and therefore its working capacity ) and the type of liquid being stored, eg leaded, unleaded etc;
- Appropriate drainage to capture spill petrol;
- Segregation of the site. Consider closing all or part of the site to visitors when delivery is taking place or arranging deliveries for times when other people will not be about, eg night deliveries. All activities with the potential to create an ignition source should be excluded from both the delivery and vent areas;
- Fire separation measures and reducing ignition sources. Consider fire separation for occupied buildings and/or public thoroughfares, eg construction of building to be such as to allow occupants at least half an hour for escape or the construction of an imperforate protective wall (local fire authority or local authority building control inspector can advise).

**VENTING**

- Siting of vent pipes. For all categories of site it is essential that vent pipe outlets are positioned 3 metres or more (2 m if a vapour recovery system is fitted) from potential ignition sources or from openings in buildings where vapours could enter and accumulate. Where this is not the case consideration should be given to resiting the pipe or redesigning its upper section to achieve this. All ignition sources must be excluded from the hazardous area around the pipe while tanker deliveries are taking place. If resiting of vent pipes is impracticable a strict system of work must be adopted to exclude ignition sources from around the vent pipes while delivery is taking place;
- Flame arresters should be fitted to all vent outlets and vapour return lines (where fitted);
- All above-ground vent pipes should be constructed of metal;
- Warning notices should be provided, ie 'No Smoking' signs;
- Segregation of the site. See above under 'Delivery'.

<table>
<thead>
<tr>
<th>SYSTEMS OF WORK</th>
<th>GROUP 'A' SITES</th>
<th>GROUP 'B' SITES</th>
<th>GROUP 'C' SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION OF FILL POINT</td>
<td>Consider locating fill point to a distance of between 6 to 12 metres from building(s) and over 4 metres from the public thoroughfare</td>
<td>Consider locating fill point to a distance of between 6 to 12 metres from building(s) and over 4 metres from the public thoroughfare</td>
<td>Consider locating fill point to a distance of over 12 metres from building(s) and over 4 metres from the public thoroughfare</td>
</tr>
<tr>
<td>LOCATION OF ROAD TANKER STANDING AREA</td>
<td>Consider providing a level road tanker standing area wholly within the confines of the site</td>
<td>Consider providing a level road tanker standing area wholly within the confines of the site</td>
<td></td>
</tr>
<tr>
<td>ACCESS FOR TANKER</td>
<td>Consider adopting a system of supervision for any manoeuvring of the tanker on to or within the site</td>
<td>Consider adopting a system of supervision for any manoeuvring of the tanker on to or within the site including the provision of adequate warning equipment (cones etc)</td>
<td>Consider adopting a system of supervision for any manoeuvring of the tanker on to or within the site including the provision of adequate warning equipment (cones etc)</td>
</tr>
<tr>
<td>SPILLAGE CONTROL</td>
<td>Consider providing bunding for tanks or adequate drainage system, eg impervious surface, ditches, channels, grids, retaining walls adequate to contain spillage or direct it to a safe place</td>
<td>Consider installing an interceptor and suitable drainage system</td>
<td>Consider installing a full retention interceptor and suitable drainage system</td>
</tr>
<tr>
<td>WARNING DEVICES</td>
<td>Consider fitting an overfill alarm or introduce a trief and appropriate system of work for delivery</td>
<td>Consider fitting an overfill prevention device plus system of work to respond to device being activated</td>
<td>Consider fitting a fail-safe overfill prevention device plus system of work to respond to device being activated</td>
</tr>
</tbody>
</table>

**DELIVERY (and venting)**

You now need to consider what, if anything, needs to be done to control the hazards and/or risks (see paragraph 34).

**EXAMPLE CONTROL MEASURES FOR DELIVERY and VENTING**

<table>
<thead>
<tr>
<th>SYSTEMS OF WORK</th>
<th>GROUP 'A' SITES</th>
<th>GROUP 'B' SITES</th>
<th>GROUP 'C' SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION OF FILL POINT</td>
<td>Consider locating fill point to a distance of between 6 to 12 metres from building(s) and over 4 metres from the public thoroughfare</td>
<td>Consider locating fill point to a distance of between 6 to 12 metres from building(s) and over 4 metres from the public thoroughfare</td>
<td>Consider locating fill point to a distance of over 12 metres from building(s) and over 4 metres from the public thoroughfare</td>
</tr>
<tr>
<td>LOCATION OF ROAD TANKER STANDING AREA</td>
<td>Consider providing a level road tanker standing area wholly within the confines of the site</td>
<td>Consider providing a level road tanker standing area wholly within the confines of the site</td>
<td></td>
</tr>
<tr>
<td>ACCESS FOR TANKER</td>
<td>Consider adopting a system of supervision for any manoeuvring of the tanker on to or within the site</td>
<td>Consider adopting a system of supervision for any manoeuvring of the tanker on to or within the site including the provision of adequate warning equipment (cones etc)</td>
<td>Consider adopting a system of supervision for any manoeuvring of the tanker on to or within the site including the provision of adequate warning equipment (cones etc)</td>
</tr>
<tr>
<td>SPILLAGE CONTROL</td>
<td>Consider providing bunding for tanks or adequate drainage system, eg impervious surface, ditches, channels, grids, retaining walls adequate to contain spillage or direct it to a safe place</td>
<td>Consider installing an interceptor and suitable drainage system</td>
<td>Consider installing a full retention interceptor and suitable drainage system</td>
</tr>
<tr>
<td>WARNING DEVICES</td>
<td>Consider fitting an overfill alarm or introduce a trief and appropriate system of work for delivery</td>
<td>Consider fitting an overfill prevention device plus system of work to respond to device being activated</td>
<td>Consider fitting a fail-safe overfill prevention device plus system of work to respond to device being activated</td>
</tr>
</tbody>
</table>

**VENTING**

- When a storage tank is filled from a road tanker, flammable vapour is displaced from the storage tank through the vent pipe into the atmosphere. Vents should be positioned to reduce the risk of a build-up of vapour and possible ignition. Stage 1b vapour balancing systems are designed to return vapour displaced from the storage tank during delivery back to the road tanker; this reduces the quantity of flammable vapours released from vent pipes.

**HEIGHT OF VENT PIPE OUTLET ABOVE GROUND**

- Sites with a throughput of more than 500 000 litres per annum
  - Vent pipes should be at least 5 metres in height and consideration should be given to the fitting of a stage 1b vapour recovery system to reduce the amount of flammable vapour emitted
- Sites with a throughput of less than 500 000 litres per annum
  - Normally acceptable for vent pipes to be more than the height of the delivery tanker
STORAGE

37 This element deals with the storage of petrol in below-ground tanks and the likelihood that they could leak, and if so the risk that such a leak may go undetected and affect others.

Weighting factor

The first task is to determine the individual characteristics of the site. Consider the following descriptors and select the one which applies to your site. Then multiply your total score from the next section by the factor shown.

(a) A site with: residential accommodation within 6 metres of the tank area OR tank(s) located within or under a building OR within 30 metres of an underground road/rail tunnel/basement or cellar.

MULTIPLY TOTAL SCORE FOR STORAGE BY A WEIGHTING FACTOR OF 5.

(b) Tank(s) located between 6 and 30 metres from residential accommodation.

MULTIPLY TOTAL SCORE FOR STORAGE BY A WEIGHTING FACTOR OF 3.

(c) Tank(s) located more than 30 metres from:
- residential accommodation;
- a basement/cellar;
- an underground road or rail tunnel.

MULTIPLY TOTAL SCORE FOR STORAGE BY A WEIGHTING FACTOR OF 1.

For underground tanks, the ability for leaking petrol to enter chambers such as cellars, basements, tunnels, drains and sewers increases the risk that an undetected build-up of petrol, and more importantly its vapours, can occur. In circumstances where petrol can easily travel further off the site than the distances indicated above, eg via nearby water courses which act as a vehicle for carrying petrol, a higher weighting factor category may be necessary.
STORAGE

Consider the following table and select one descriptor for each aspect which most closely describes your site (see paragraph 33).

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Descriptor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of tank(s)</td>
<td>- Over 30 years</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>- 20-30 years</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>- Less than 20 years</td>
<td>1</td>
</tr>
<tr>
<td><strong>The chances that the tank will leak increase with its age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction of tank(s)</td>
<td>- single skin metallic</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>- single skin non-metallic, eg GRP or equivalent, or double skin without</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>a constant monitoring device fitted between the skins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- double skin with constant monitoring device fitted between the skins</td>
<td>1</td>
</tr>
</tbody>
</table>

Weighting factor from previous page is (.....) X total for both aspects (.....) = (.....)

**Overall rating:**

- **Group A. 2-11 points**
- **Group B. 12-21 points**
- **Group C. 22-30 points**

Increasing hazard
STORAGE - SELECTING APPROPRIATE CONTROL MEASURES.

You now need to consider what, if anything, needs to be done to control the hazards and/or risks (see paragraph 34).

EXAMPLE CONTROL MEASURES FOR STORAGE SYSTEMS

<table>
<thead>
<tr>
<th>SYSTEMS OF WORK</th>
<th>GROUP 'A' SITES</th>
<th>GROUP 'B' SITES</th>
<th>GROUP 'C' SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTRUCTION OF TANKS</td>
<td>Consider replacing single skin steel tank with single skin non-metallic or double skin tank</td>
<td>Consider replacing single skin steel tank with double skin tank with interstitial monitoring system</td>
<td></td>
</tr>
<tr>
<td>SITING OF TANKS (considered normally reserved for situations of particular concern or at the design stage)</td>
<td>Consider siting the tanks over 15 metres away from: - buildings - road/rail tunnel - basement/cellar</td>
<td>Consider siting the tanks over 15 metres away from: - buildings - road/rail tunnel - basement/cellar</td>
<td>Consider siting the tanks over 30 metres away from: - buildings - road/rail tunnel - basement/cellar</td>
</tr>
<tr>
<td>MONITORING FOR LEAKS</td>
<td>Consider means of monitoring tank contents to detect leaks at an early stage: - frequency of dipping - need for constant monitoring system - leak alarm system - frequency of testing, the fitting of observation wells</td>
<td>Consider precision testing of tanks or other test methods (and frequency) including the fitting of observation wells which will afford easy access for monitoring equipment at frequent intervals</td>
<td>Consider installing a continuous monitoring device or an ASR leak detection system (which include the fitting of observation wells) or precision testing of tanks at intervals agreed with the Petroleum Licensing Authority</td>
</tr>
<tr>
<td>RELINING OF TANKS</td>
<td>As an alternative to replacing tanks they may be relined and in some circumstances a leak detection system fitted as part of the process. Such a consideration should be fully discussed with your Petroleum Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROL MEASURES NORMALLY REQUIRED AT ALL SITES</td>
<td>- Where constant monitoring devices are fitted they need to be maintained and tested at intervals. - All sites should have some form of inventory control. An effective system to check and record the contents of tanks and to fully investigate any unexplained losses is an essential system of work for all sites</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Guidance on the controls necessary for above-ground tanks can be found in The storage of flammable liquids in fixed tanks (up to 10,000 m³ total capacity) (See Appendix 5)
PIPEWORK SYSTEMS

This element deals with all the pipe systems (lines) which are mainly situated underground from the delivery area to the storage facility and then to the dispensing facility. It includes off-set fill pipes, suction lines, pressure lines, siphon lines and vent pipes.

Weighting factor

The first task is to determine the individual characteristics of the site. Consider the following descriptors and select the one which applies to your site. Then multiply your total score from the next section by the factor shown:

(a) A site with: residential accommodation within 6 metres of the line(s) OR line(s) located within or under a building OR within 30 metres of an underground road/rail tunnel/basement or cellar.

MULTIPLY TOTAL SCORE FOR PIPEWORK SYSTEMS BY A WEIGHTING FACTOR OF 5.

(b) Line(s) located between 6 and 30 metres from residential accommodation.

MULTIPLY TOTAL SCORE FOR PIPEWORK SYSTEMS BY A WEIGHTING FACTOR OF 3.

(c) Lines located more than 30 metres from:
   - residential accommodation;
   - a basement/cellar;
   - an underground road or rail tunnel.

MULTIPLY TOTAL SCORE FOR PIPEWORK SYSTEMS BY A WEIGHTING FACTOR OF 1.

Experience suggests that underground pipework systems are the source of the majority of petrol leaks. For underground lines the ability for leaks to enter chambers such as cellars, basements, tunnels, drains and sewers increases the risk that an undetected build-up of petrol, and more importantly its vapours, can occur.

In circumstances where petrol can easily travel further off the site than the distances indicated above, eg via nearby water courses which act as a vehicle for carrying petrol, a higher weighting factor category may be necessary.
PIPEWORK SYSTEMS

Consider the following table and select one descriptor for each aspect which most closely describes your site (see paragraph 33).

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Descriptor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of lines</td>
<td>Over 30 years</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>20-30 years</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Less than 20 years</td>
<td>1</td>
</tr>
</tbody>
</table>

( Don't forget to include any offset fill lines in your assessment)

Construction

| The risk of corrosion is especially high for steel lines. Experience has shown that the potential for leaks increase significantly for steel pipework over 30 years of age |
|----------------------------------------------------------------------------------|------------------------------------------|
| single skin metallic                                                             | 3                                         |
| single skin non metallic                                                          | 2                                         |
| double skin with constant monitoring between the skins                            | 1                                         |

(Metallic includes galvanised steel)

Type of system

<table>
<thead>
<tr>
<th>Systems which rely on pressure to force petrol through the lines pose a particular hazard as the amount of petrol which will be lost over a very short period, if a leak occurs, can be considerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
</tr>
<tr>
<td>Suction or siphon</td>
</tr>
</tbody>
</table>

Weighting factor from previous page is (.....) X total for all three aspects (.....) = (.....)

Overall rating:  

Group A. 3-17 points  
Group B. 18-31 points  
Group C. 32-45 points

Increasing hazard
**PIPEWORK SYSTEMS - SELECTING APPROPRIATE CONTROL MEASURES**

You now need to consider what, if anything, needs to be done to control the hazards and/or risks (see paragraph 34).

**EXAMPLE CONTROL MEASURES FOR PIPEWORK SYSTEMS**

<table>
<thead>
<tr>
<th>SYSTEMS OF WORK</th>
<th>GROUP 'A' SITES</th>
<th>GROUP 'B' SITES</th>
<th>GROUP 'C' SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTRUCTION OF LINES (including any off-set fill)</td>
<td>Consider replacing corrodble single skin pipework with non-corrodbile or secondary contained pipework</td>
<td>Consider replacing corrodble single skin pipework with non-corrodbile secondary contained pipework</td>
<td>Consider replacing corrodble single skin pipework with non-corrodbile secondary contained pipework</td>
</tr>
<tr>
<td>LEAK MONITORING</td>
<td>Consider precision testing of pipework or other test methods. Also consider means of monitoring contents of system to detect leaks at an early stage: - inventory control - frequency of dipping - need for constant monitoring device - leak alarm system - frequency of testing</td>
<td>Consider installing an ASR leak detection system (which includes the installation of monitoring wells) or precision testing at intervals agreed with the Petroleum Licensing Authority</td>
<td>Consider installing a continuous monitoring device</td>
</tr>
<tr>
<td>CHECK VALVES</td>
<td>For suction systems consider relocating the check valve(s) to under each pump or fit new valve(s) under pump(s) where none are fitted</td>
<td>For suction systems consider relocating the check valve(s) to under each pump or fit new valve(s) under pump(s) where none are fitted</td>
<td>For suction systems consider relocating the check valve(s) to under each pump or fit new valve(s) under pump(s) where none are fitted</td>
</tr>
<tr>
<td>CONTROL MEASURES NORMALLY REQUIRED AT ALL SITES</td>
<td>- Where constant monitoring devices are fitted they need to be maintained and tested at intervals</td>
<td>- All sites should have some form of inventory control</td>
<td>- All sites should have some form of inventory control</td>
</tr>
<tr>
<td></td>
<td>- All lines should be clearly marked to show which pump/tank they relate to</td>
<td>- All lines should be clearly marked to show which pump/tank they relate to</td>
<td>- All lines should be clearly marked to show which pump/tank they relate to</td>
</tr>
<tr>
<td></td>
<td>- All valves should be clearly marked to show method of operation and purpose etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DISPENSING

39 This element deals with dispensing, ie the transfer of the petrol from its storage vessel to the fuel tank of a motor vehicle, or suitable petrol container. It considers the possibility that an incident could occur during dispensing or to the dispensing equipment.

Weighting factor

The first task is to determine the individual characteristics of the site. Consider the following descriptors and select the one which applies to your site. Then multiply your total score from the next section by the factor shown:

(a) A site with a throughput of more than 5 million litres per year* OR over 100 people at any one point in time within the area potentially affected by the dispensing operation**: Motorway service areas, hypermarket sites and sites in the built-up areas of cities or large towns would usually fall into this category. 
MULITPLY TOTAL SCORE FOR DISPENSING BY A WEIGHTING FACTOR OF 5.

(b) A site with a throughput of between 500000 and five million litres per year* OR between ten and 100 people at any one point in time within the area potentially affected by the dispensing operation**: Average-size service stations and some non-retail sites in towns and suburban areas would usually fall into this category.
MULITPLY TOTAL SCORE FOR DISPENSING BY A WEIGHTING FACTOR OF 3

(c) A site with a throughput of less than 500 000 litres per year* OR less than ten people at any one point in time within the area potentially affected by the dispensing operation**: Small rural filling-stations, farm sites, stately homes and some other non-retail facilities not in built-up areas may fall into this category.
MULITPLY TOTAL SCORE FOR DISPENSING BY A WEIGHTING FACTOR OF 1

* When calculating the throughput of the site the most recently completed 12-month period should be used. For sites in the design stage this figure should be based on the projected volume of the site when fully established.

** When calculating the number of people potentially affected (see also paragraph 25), as a rough guide you should include people up to four metres from the dispensing area. Don’t forget to include such things as pedestrian custom to a busy site shop. Count the maximum number of people that could be affected at peak times. For example, if pedestrian traffic to and from a school increases the number within the four-metre area at certain times of the day, you should use the higher figure.
DISPENSING - Consider the following table and select one descriptor for each aspect which most closely describes your site (see paragraph 33).

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Descriptor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard dispenser certified to</td>
<td>Electric pump/s with no standard</td>
<td>3</td>
</tr>
<tr>
<td>Modern dispensers contain safety features and should conform to a British Standard or equivalent. Older dispensers may be less reliable. A small plate should be on the side of the the dispenser casing detailing its standard</td>
<td>SFA 3002 Standard</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>BS7117 or EN equivalent or hand operated</td>
<td>1</td>
</tr>
<tr>
<td>Siting of vehicles</td>
<td>Vehicles being refuelled partly or wholly on the public highway, or in a building, or where there is a danger to people refuelling</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Vehicles being refuelled have to reverse or negotiate to get to pump</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Vehicles being refuelled wholly on site and able to drive on and off site easily</td>
<td>1</td>
</tr>
<tr>
<td>Siting of dispensers</td>
<td>Within building or under living accommodation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Within approximately 4 metres of the public thoroughfare or site boundary or within 6 metres of occupied buildings or within 9 metres of residential accommodation</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>More than 4 metres from the public thoroughfare or site boundary and more than 6 metres from occupied buildings and more than 9 metres from living accommodation</td>
<td>1</td>
</tr>
</tbody>
</table>

Weighting factor from previous page is (.....) X total for all three aspects (.....) = (.....)

Overall rating: Group A. 3-10 points Group B. 11-24 points Group C. 25-45 points

Increasing hazard
DISPENSING - SELECTING APPROPRIATE CONTROL MEASURES.

You now need to consider what, if anything, needs to be done to control the hazards and/or risks (see paragraph 34).

EXAMPLE CONTROL MEASURES FOR THE DISPENSING OPERATION

<table>
<thead>
<tr>
<th>SYSTEMS OF WORK</th>
<th>GROUP 'A' SITES</th>
<th>GROUP 'B' SITES</th>
<th>GROUP 'C' SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION OF DISPENSING EQUIPMENT</td>
<td>Consider moving dispensing equipment to more than 4 metres away from buildings, the highway or other sources of ignition</td>
<td>Where supervision/visibility is not constant consider methods to ensure that adequate provision is made against misuse of equipment, ie: - security - instruction notices - control of product to dispenser (remote switches)</td>
<td>Consider increasing supervision and/or visibility so that the dispensing operation is supervised/monitored directly or indirectly at all times (eg poor visibility supplemented by other means)</td>
</tr>
<tr>
<td>IMPROVE VISIBILITY AND/OR SUPERVISION</td>
<td>Consider increasing supervision and/or visibility so that the dispensing operation is supervised/monitored directly or indirectly at all times (eg poor visibility supplemented by other means)</td>
<td>Consider increasing supervision and/or visibility so that the dispensing operation is directly supervised/monitored at all times</td>
<td></td>
</tr>
<tr>
<td>INCIDENT CONTROL MEASURES</td>
<td>Consider installing an impermeable surface</td>
<td>Consider installing an interceptor and adequate drainage system</td>
<td>Consider installing an interceptor and adequate drainage system</td>
</tr>
<tr>
<td>FIRE SEPARATION MEASURES</td>
<td>Consider fire separation for occupied buildings - eg construction of building to be such as to allow occupants at least half an hour for example, or the construction of an impermeable protective wall (cement fire authority or local authority building control inspector can advise)</td>
<td>Consider fire separation for occupied buildings - eg construction of building to be such as to allow occupants at least half an hour for example, or the construction of an impermeable protective wall (cement fire authority or local authority building control inspector can advise)</td>
<td>Consider fire separation for occupied buildings - eg construction of building to be such as to allow occupants at least half an hour for example, or the construction of an impermeable protective wall (cement fire authority or local authority building control inspector can advise)</td>
</tr>
</tbody>
</table>

DISPENSING

The following are control measures normally required at all sites:

- For all categories of site it is essential that ignition sources are strictly controlled within a 4-metre radius of the dispensers;
- Inspection/maintenance of dispensers and hoses on a regular basis for signs of wear and tear;
- To avoid danger from vehicle collision consider whether:
  - there is sufficient room for vehicles to pass through;
  - there is a need to protect dispensers;
  - the removal of other obstacles, such as vehicles parked for other site activities, is necessary;
- Adequate illumination of dispensing area;
- Electrical equipment inspected regularly;
- Impermeable surface and adequate drainage of spill product to a safe place - ie slopes, channels, grates, retaining walls adequate to contain spillage or direct it to a safe place;
- Drainage system (where present) maintained on a regular basis;
- Instructions to and training of staff in all aspects of dispensing operation, including dealing with spills and other incidents;
- Adequate instruction and warning notices;
- Control of minor spills - availability of sand;
- Layout of dispensers to allow forward exit of vehicles in the event of fire;
- Maintenance of dispensers carried out by competent persons;
- Materials used to clean dispensers have anti-static properties;
- Fire-fighting equipment.

In addition, the following may be required for unattended sites:

- Emergency cut-off switch;
- Emergency telephone for summoning assistance;
- Limit on the amount served and time period a dispenser can operate during one transaction;
- Use of unlatched safety nozzles.
EXAMPLES OF GENERAL CONTROL MEASURES FOR ALL SITES

The following control measures are examples of those required at all sites irrespective of the degree of hazard. They are not specific to any one area of a site.

General considerations

Site maintenance scheme to reduce fire hazards such as:

- rubbish;
- overgrown grassed or planted areas;
- accumulation of flammable materials from other site activities;
- oily rags, cans etc;
- maintenance of essential warning signs.

The safe storage of saleable goods with the potential to create a fire hazard - charcoal, paraffin etc and, in particular, liquid propane gas cylinders.

Management of the site will benefit from maintenance of clear, readily available records of key activities. Such records will ensure that safety performance can be monitored effectively, and maintenance and servicing needs can be identified. In addition, it is suggested that records of the type of plant and equipment be kept with details of when it was installed, modified, repaired, replaced, serviced or inspected. Details of inventory checks should be included along with written procedures for normal and emergency operations. Your Petroleum Officer can advise you on this and may be able to provide a specimen register for keeping such records.

Electrical considerations

Consideration of electrical systems should cover the following:

- Does the installation meet the requirements of relevant regulations?
- Can the installation be isolated safely in the event of an emergency?
- Is there regular inspection of all electrical installations with regard to their siting and the hazards posed by electrical equipment as possible ignition sources?
• Is there protection from being struck by lightning?
• Are circuit labels correct?
• Are there dangers from ignition from overhead power lines?
• Can the installation be fully tested in safety?
• Is the frequency and extent of inspection and testing adequate to maintain safety?
• Is the electrical contractor used competent?
• Have deficiencies found in periodic test/inspection been rectified?
• Do any modifications to the system infringe safety requirements?
• Is the earthing system suitable?
• Is the installation adequately protected when unrelated civil work is carried out (road works etc.)?
• Is operation of unapproved equipment prevented in hazardous areas (see paragraph 21)?

**STEP 4 RECORD YOUR FINDINGS**

41 It is good practice to record in writing the significant findings of your risk assessment; the Management of Health and Safety at Work Regulations 1992 insist you do this if you have five employees or more. These should include:

(a) significant hazards identified in your assessment, i.e. those which might pose serious risk to workers or others who might be affected by the work activity if not properly controlled;

(b) existing control measures and the extent to which they control the risks (this need not replicate details of measures more fully described in works manuals etc. but could refer to them);

(c) the people who may be affected by these significant risks or hazards, including any groups of employees who are especially at risk.

Inform your employees about your findings and discuss what can be done to overcome problems.

Keep your records for future reference. It will help if you are questioned on your precautions, or in discussions with your Petroleum Officer, or if involved in any civil liability case.
**STEP 5** Review your assessment from time to time and revise as necessary

42 While carrying out your assessment you should decide when it should next be done. This may depend on the manufacturers' recommendations on periods of maintenance, age of equipment etc. You should always re-assess the hazards and risks when either new equipment has been installed, or changes in or around the site have taken place, including any changes in the use of adjacent premises.

---

**APPENDIX 1: Systems of work**

Good systems of work are an important part of ensuring that an incident does not occur. If there is a problem, systems should be in place to deal with it. Take care to ensure that all procedures are understandable. Complicated procedures stand less chance of being followed. You will need to validate and monitor the use of the procedures you put in place. It is essential that there are systems of work to cover fire/explosion precautions and responses to incidents.

The areas that may need to be considered include procedures for:

1 **Commissioning**
   - Initial testing and certification of tanks, pipes and fittings;
   - Initial inspection, testing and certification of the complete electrical installation;
   - Removal of combustible material;
   - Checking that all emergency equipment has been installed and is in working order;
   - Ensuring warning and information notices are in place;
   - Ensuring all necessary means of escape are provided;
   - Tanks and associated equipment are accurately marked and identified;
   - Drainage systems are installed, connected and free from debris.

2 **Operation of site**
   - Pre-delivery of petrol;
   - Delivery of petrol;
   - Post-delivery of petrol;
   - Wetstock management, loss investigation and reporting;
   - Procedures regarding contractors;
   - Incident register - with appropriate definitions.

In addition some sites may need to consider:

- Site opening and closing for trading;
- Maintaining an operating manual;
3 Maintenance and repairs

- Register of what is required to be done - when and by whom;
- Prime areas for attention (equipment):
  - tanks (including testing of tanks and lines), pumps, lines, vent pipes,
  - manholes, fill pipes, gauges, dipsticks, fire extinguishers, tank labelling,
  - product monitoring equipment;
- Drains, interceptors, complete electrical installation, security of product.

4 Decommissioning

- Uplift of product (drain tanks and lines);
- Tanks made safe;
- Dispensing equipment made safe;
- Manholes inspected and made safe;
- Interceptors inspected and made safe;
- Drains inspected and made safe;
- Periods and methods of site inspection agreed.

APPENDIX 2: Training

1 Training is vital in helping to prevent incidents and to minimise the consequences if they do happen. Think about who should be trained, in what, and to what level of competence.

2 Training will help employees understand the health and safety aspects of their work. Initial training should be followed up as necessary with new or refresher training as required.

3 Those to be trained must include anyone who works on the site. Operators, managers, staff and occasional visitors such as maintenance contractors etc may all need some training. The public should also be considered as they will need to be given information/instruction through appropriate notices and signs.

4 Training can take many forms ranging from giving instructions either verbally or through information notices and written instructions, to formal training courses. The type of training needed should be appropriate to the activities/duties of those to be trained and the level of risk at the site.

5 In all cases there is the need to provide information, instructions and training for those who work on the site, including:

- the hazards from petrol;
- the risks they face on the site;
- the measures in place to deal with the risks;
- emergency procedures;
- any particular procedures when contractors are working on site.

6 Individuals have legal duties to comply with the safety procedures associated with their work. However, it is never sufficient simply to presume that staff will know and understand what to do. Positive instruction and training is needed. Health and safety training should take place during working hours and should be part of the job.

7 Involve and consult staff. Where there is a recognised trade union safety representative he or she will need to be consulted. They will know many of the
hazards occurring in everyday situations and should be consulted. Unusual occurrences should be catered for.

8 There should be training for new staff and refresher training for existing staff, as necessary (for example if skills such as emergency procedures are not used regularly). If poor performance shows that training is not working, the training will need to be reviewed and improved. It should not be assumed that previous experience or formal qualifications will mean that new employees do not need training.

9 Information, instruction and training must be understood by those to whom it is given. In the case of instructions to the public, notices need to be visible, clear and easily understood. Special consideration should be given to those with language difficulties, or with disabilities which impede the receipt of information, including those who have difficulties in reading or understanding English.

10 Specific training may be needed for some operations. For example, those responsible for receiving deliveries will need training in the appropriate procedures to follow; people responsible for monitoring wetstock should be trained in how to do it and what to do if there is any unexplained loss of petrol; staff on retail sites should be trained in the correct use of equipment and what to do if customers adopt unsafe practices such as attempting to fill an unsuitable container, smoking while filling their tank etc.

11 It is advisable to keep a training record for each staff member so that it is clear what training they have received and, therefore, which duties they can be expected to perform.

APPENDIX 3: Risk assessment examples

The following three examples aim to demonstrate the ‘five steps’ risk assessment process, applied to three very different types of site.

EXAMPLE

RISK ASSESSMENT FOR A FARM SITE

The installation is in a rural area, situated in a private lane. There is a drainage ditch near the storage area and some distance away a field used for static caravans.
DELIVERY (and venting)

The site has a throughput of less than 500,000 litres a year. As the caravan site is over 30 metres from the delivery point and uphill, the people on the site are not at risk. Any spill could reach the drainage ditch but it flows down the hill away from the caravan site towards the private lane. Only three to four farm employees enter the area around the delivery point. Weighting factor = 1

Location of fill points: The fill point is directly on top of the underground tank and is well away from buildings/footpaths. Score = 1

Tanker access: The tanker has access via a good but narrow road and has to manoeuvre around farm machinery to access the fill point. Score = 2

Spillages: There is no drainage system on the site and a significant spill on delivery could escape down to the drainage ditch but most would soak into the rough ground before getting that far. Score = 2

**Weighting factor of 1 x total score 5 = 5 (Group A)**

Venting systems: The vent pipe is situated immediately above the tank and is constructed of metal. It does not have a vapour recovery system, is situated well away from ignition sources and is less than three metres in height.

**What could go wrong? Should more be done?**

This is a low-hazard site for delivery but there is still the potential for something to go wrong and consideration should be given to reducing the risk. A spillage could occur during delivery either as a result of the tanker having to manoeuvre or during the transfer. Any spill could reach the drainage ditch but this is unlikely:

- The farm employee responsible for overseeing delivery would benefit from written instructions on what steps to follow for delivery and what to do in the event of an emergency;
- Farm equipment should be cleared from the access route for the tanker so it can drive straight in and swing round without reversing. If this cannot be done, then the site instructions for delivery should include supervised manoeuvring of the tanker;
- Although spillage into the ditch is unlikely the potential increases when winter conditions make the ground hard. It would be a sensible precaution to create a barrier for any spill. In this case, a trench could be dug out with the excavated soil forming a bank on its lower side to capture any spill before it reached the drainage ditch.

All employees should be made aware of these measures to ensure that they recognise their importance.

There should be no ignition sources around the vent pipe during delivery. In this case, although it would be a good idea to increase the height of the pipe it would be sufficient to ensure that the employee overseeing the delivery is clearly instructed to exclude all other people from the vent area while delivery is taking place.

**STORAGE**

The storage tank is underground and situated away from buildings. Any leak could penetrate to the drainage ditch but would not reach a populated area. **Weighting factor = 1**
What could go wrong? Should more be done?

As the dispenser is not built to a BS or European Standard it may be less safe than a more modern pump. However, there are very few people who dispense petrol, and provided adequate instruction is given on how to dispense, including emergency procedures, the operation should be relatively safe.

**GENERAL**

Thorough training, systems of work and proper documentation should go a long way to providing effective control on this site. All of these should be reviewed from time to time to ensure that they are understood and being adhered to. What to do if something does go wrong is a prime area for instructions/training. An appropriate maintenance plan is also essential.

---

**EXAMPLE**

**RISK ASSESSMENT FOR A SMALL PETROL FILLING STATION IN A RURAL LOCATION**

The attended service site is located on a typical quiet suburban road.

Constructed in the mid-fifties, the site was partially redeveloped in the late sixties when three additional tanks were installed. Due to the layout of the forecourt surface, water drains to a natural hollow adjacent to one of the delivery areas. Within ten metres of the rear of the site are houses. This distance was paced out to give a rough measure. As it was established that it was well within the 30-metre criteria, accurate measurement was not necessary.
Delivery (and venting)

Throughput averages 900 000 litres p/a with less than ten people likely to be affected should a fire or explosion occur during a road tanker delivery. Although there are two separate unloading positions, they are similar, allowing a single assessment to be carried out for both.

**Weighting factor = 3**

Location of fill points: Both fill points are located more than 12 metres from a building of any kind.

Score = 1

Tanker access: The tanker is wholly on site, with no need to reverse.

Score = 1

Spillages: The below-ground fill points have good access and any large spills would drain to the natural hollow, surrounded by fields.

Score = 1

**Weighting factor of 3 x total score of 3 = 9 (Group A)**

Venting: There are two vents, each venting to atmosphere, with outlets over 3 metres from sources of ignition or openings to buildings. Each is 4 metres in height (ie higher than the liquid level in the road tanker).

What could go wrong? Should more be done?

The natural slope of the forecourt drains any spillages to the relative safety of the hollow adjacent to the tanks and no additional spillage controls are necessary in this case. With the constant turnover of staff, a training programme is needed to ensure that staff supervising road tanker deliveries are competent.

Also, the following recommendations are made:

- Adequate lighting should be provided at each delivery point for deliveries outside daylight hours.
- The standard lamp within 3 metres of one of the fill points should be suitably protected for a zoned area.

Storage

The two groups of tanks warrant separate assessments because of their age and separate locations.

(a) Tanks 1 and 2 are 10 m from houses which do not have cellars.

They are:

- 39 years old
- Single skin, steel construction

**Weighting factor of 3 x total score of 6 = 18 (Group B)**

(b) Tanks 3, 4 and 5 are located more than 30 metres from any above or below-ground structure.

They are:

- 30 years old
- Single skin, steel construction

**Weighting factor of 1 x total score of 3 = 3 (Group A)**

Pipework

The age and location of the pipework associated with two separate groups of tanks warrant separate assessment.

(a) Part of the pipework associated with tanks 1 and 2 is within 30 metres of the houses.

They are:

- 39 years old
- Single skin, steel construction

**Weighting factor of 3 x total score of 7 = 21 (Group B)**

(b) The pipework associated with tanks 3, 4 and 5 is located more than 30 metres from any above or below-ground structure.

They are:

- 25 years old
- Single skin, steel construction

**Weighting factor of 1 x total score of 6 = 6 (Group A)**

What could go wrong? Should more be done?

(a) In view of their age, construction and proximity to the houses it is important that any leaks are detected at an early stage.

In agreement with the local Petroleum Licensing Authority, the operator currently has the tanks precision tested every two years and carries out wetstock reconciliation each working day.

In addition it would be sensible to provide observation wells between the tanks and the houses into which monitoring equipment can be inserted at frequent intervals.

Alternatively the precision tests could be done annually or the tanks used for storing either less hazardous products.

In the longer term the potential for the tanks to leak will increase with age and in future assessments consideration should be given to either refilling or replacing the tanks. This could be at a safer location or in the same place with a double skin tank(s) complete with interstitial monitoring.

(b) The operator precision tests the tanks at intervals agreed with the Petroleum Licensing Authority and carries out wetstock reconciliation each working day.

**Weighting factor of 3 x total score of 7 = 21 (Group B)**

What could go wrong? Should more be done?

(a) In agreement with the local Petroleum Licensing Authority, the operator has the pipework (suction and vent) precision tested every two years and also has to carry out a wetstock reconciliation each working day.
The provision of observation wells for the tanks will also cover part of the pipework. However, adequate control can be achieved by the fitting of under-pump check valves which will give immediate indication of any problems in the pipes.

The longer-term considerations for tanks 1 and 2 also apply to their associated pipework.

(b) The operator has the pipework (suction and vent) precision tested at intervals agreed with the Petroleum Licensing Authority and also carries out wetstock reconciliation each working day.

Dispensing

Throughput at this attended service site averages 990,000 litres p/a with less than ten people likely to be affected should a fire or explosion occur in the dispensing area.  

Weighting factor = 3

The four dispensers are all well maintained and are pre-SFA 3002 in standard.  

Score = 2

There is sufficient space on the forecourt for queuing vehicles which do not have to manoeuvre.  

Score = 1

The dispensers are located 6 metres from the footpath/road and 10 metres from a building of any kind.  

Score = 1

Weighting factor of 3 x total score of 4 = 12 (Group B)

What could go wrong? Should more be done?

The forecourt surrounding the dispenser islands is in need of repair to maintain the original impermeable surface.

All of the suggested improvements should be discussed and agreed with the local Petroleum Officer, including the timescales involved.

Example:

RISK ASSESSMENT FOR A BUSY, CITY CENTRE, PETROL FILLING STATION

This site is located in an urban area which consists of mainly residential housing, although there is a secondary school situated down the hill 36 metres from the site. The road on which it is situated is a busy main thoroughfare. Above ground the petrol station has a modern appearance, there is good access and egress from the site, a car wash and a modern sales building. The site operates on a self-service system with six dispenser islands and modern self-service dispensers.

Although it is not obvious by looking at the site, it is built over a rail tunnel. This tunnel is under the dispensing area, but within 30 m of the tank installation. The underground installation including tanks, lines and drainage was installed 30 years ago.
**Delivery (and venting)**

The site has a throughput in excess of 5 million litres and could affect more than 100 people (the school) if something went wrong with the delivery.

- **Weighting factor = 5**

- **Location of fill points: More than 6 metres from a building.**
  - **Score = 1**

- **Tanker access: Wholly on site, with no need to reverse**
  - **Score = 1**

- **Spillages**: The product may leave the site and run downhill towards the school as a drainage channel has not been provided and the separator is of old brick construction with limited storage capacity.
  - **Score = 4**

**Weighting factor = 5 x total score of 6 = 30 (Group C)**

**What could go wrong? Should more be done?**

The measures to be taken at this site are limited to controlling any spillage. The additional risk is the school down the hill from the station as a large spillage could run off the site towards the school.

The site has a high staff turnover and the operator needs to ensure that staff are well and consistently trained regarding deliveries. The operator can also consider rescheduling his deliveries outside the normal operating hours of the school, until the site improves its drainage and installs a full retention interceptor.

The vent stack is situated in the middle of the site away from houses and electrical equipment, is 6 metres high and should not pose a hazard.

**Storage**

The tanks are positioned close to the rail tunnel.

- **Weighting factor = 5**

- **They are:**
  - over 30 years old  
    - **Score = 3**
  - single skin, steel construction  
    - **Score = 3**

**Weighting factor = 5 x total score of 6 = 30 (Group C)**

**What could go wrong? Should more be done?**

In this case the age of the tanks and their method of construction increases the likelihood of a leak. Their position so close to the tunnel means that a leak is almost certain to enter the tunnel, which has electrified lines.

The installation has the potential for causing a major accident and therefore serious consideration should be given to either relining the tanks with a double skin lining with a leak detection system or replacing them with double skin tanks. The operator should discuss the time-scales for alterations with the Petrolene Licensing Authority, but in the interim a strict system of work should be adopted to monitor for product loss on a daily basis.

**Dispensing**

The throughput is over 5 million litres.

- **Weighting factor = 5**

- **The dispensers are all BS 7117.**
  - **Score = 1**

- **Vehicles refuelled on site.**
  - **Score = 1**

- **The dispensers are sited more than 4 metres from road and 6 metres from buildings.**
  - **Score = 1**

**Weighting factor = 5 x total score of 7 = 35 (Group C)**

**What could go wrong? Should more be done?**

The position of the lines within 1 metre of the tunnel top is again a major problem and they should be considered in the same way as the tanks. The lines should ultimately be replaced with a double skin system monitored by a leak detection system. In the interim the system of work recommended for the tanks will give early warning of leaks.

**Pipework**

The pipework runs from the tanks to the pumps, immediately over the tunnel. The tanks are filled from remote fill points.

- **Weighting factor = 5**

The pens are all BS 7117.

- **Score = 1**

- **Vehicles refuelled on site.**
  - **Score = 1**

- **The dispensers are sited more than 4 metres from road and 6 metres from buildings.**
  - **Score = 1**

**Weighting factor = 5 x total score of 3 = 15 (Group B)**

**What could go wrong? Should more be done?**

No additional controls are considered necessary.
APPENDIX 4: Relevant legislation

Key legislation

This Act places a general duty on employers to ensure the safety of both employees and other people from the risks arising from the work activity, as far as is reasonably practicable.

The keeping of petrol is covered by the Petroleum (Consolidation) Act 1928. This Act requires that the keeping of petrol must be authorised by a licence. Although HSE has policy responsibility, enforcement, the issue of a licence and the setting of any conditions attached to it are the responsibility of Petroleum Licensing Authorities (PLAs). In general, licensing authorities are the Fire and Civil Defence Authorities in the former Metropolitan Authorities; County Councils or Unitary Authorities elsewhere in England and Wales; and the Councils, Islands and Isles Councils in Scotland. However, licensing falls to statutory harbour authorities for harbour areas and to the HSE at any site which is subject to the Notification of Installations Handling Hazardous Substances Regulations 1982.

These Regulations set more specific requirements on the management of health and safety. These include duties to introduce effective planning, organisation, control, monitoring and review, all based on an adequate risk assessment; appointment of competent persons; provision of information to employees and contractors; training; and procedures in the event of imminent danger. An Approved Code of Practice supports the Regulations.

Enforcement responsibilities

Petroleum Licensing Authorities (PLAs) are responsible for enforcing:

- The issue of licences and licence conditions under the Petroleum (Consolidation) Act 1928;
- the unloading of petrol from road tankers at licensed premises under Regulation 23 and Schedule 4 of the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992;
- the unloading of petrol from road tankers at licensed premises under Sections 2 to 8 of the Health and Safety at Work etc. Act 1974 (currently under review).

Local Authority Environmental Health Departments are responsible for enforcing:

- The Health and Safety at Work etc. Act 1974 at petrol filling-stations and other local authority enforced premises except for Section 6 (HSE responsibility) and Sections 2 to 5 (currently under review) when a road tanker is unloading petrol (PLA responsibility).

HSE is responsible for enforcing:

- The Health and Safety at Work etc. Act 1974 at premises other than those where it is the responsibility of the local authority and at sites which come under the Control of Industrial Major Accident Hazards Regulations 1994 and in the petroleum licensing and enforcing authority at sites which come under the Notification of Installations Handling Hazardous Substances Regulations 1982.
- Section 6 of the Health and Safety at Work etc. Act 1974 at local authority enforced premises, except during the unloading of petrol from a road tanker (PLA responsibility).

Other legislation


The Public Health Act 1961 (Section 73) ISBN 0 10 8502147 and the Civic Government (Scotland) Act 1982 (Section 94) ISBN 0 10 54582 7

Road Traffic (Carriage of Dangerous Substances in Packages etc) Regulations 1992 (currently under review) SI 1992/742: ISBN 0 11 025502 0


 Environmental Protection Act 1990: ISBN 0 10 544900 5
APPENDIX 5: Other sources of advice and further reading

The Administrator, Association for Petroleum and Explosives Administration, PO Box 2, Hadleigh, Suffolk IP7 5SF

The storage of flammable liquids in fixed tanks (up to 10 000 m³ total capacity) HSG50 HSE Books 1990 ISBN 0 11 885532 8

The storage of flammable liquids in containers HSG161 HSE Books 1990 ISBN 0 7176 0481 0


Electricity at work: Safe working practices HSG85 HSE Books 1991 ISBN 0 7176 0442 X


BS 7671: 1992 IEE Electrical Wiring Regulations

BS 5345 Code of practice for the selection and maintenance of electrical equipment for use in potentially explosive atmospheres

Cleaning and gas freeing of tanks containing flammable residues HSE Books 1985 ISBN 0 11 883518 1


Plastic containers with nominal capacities up to five litres for petroleum spirit. Requirements for testing and marking or labelling COP6 HSE Books 1982 ISBN 0 11 883643 9


Institute of Petroleum codes of practice relevant to the design and construction of petrol filling-stations available from the Institute of Petroleum, 61 New Cavendish Street, London W1 M 8AB

Model code of safe practice: Part 1 - Electrical safety code; Part 15 - Area classification code for petroleum installations

Code of practice for driver controlled deliveries to premises licensed for the storage of petroleum spirit

Guidelines for the design and operations of gasoline vapour emissions controls

Performance specification for underground pipework systems at petrol filling-stations

APPENDIX 6: Glossary of terms

Attendant operated. Where an attendant directly operates and controls the dispensing equipment and the discharge nozzle.

Attended self-service. Where customers operate the dispensing equipment which is activated, supervised and may be shut off in an emergency by an attendant in a control point.

Automatic safety nozzle. A device for controlling the flow of fuel during a dispensing operation, which automatically switches itself off and stops the flow of petrol when the liquid level rises above the spout.

Automatic Statistical Inventory Reconciliation (ASIR). A system of tank detection for tanks and pipework. It utilises a tank gauging system which is linked to dispensers and automatically reconciles the product withdrawals to the deliveries, and thus provides a reliable indication of any leakage in tanks and pipe systems.

Bundling: An enclosed wall system to retain spill liquid.

Check valve. A type of non-return valve used in suction lines which prevents petrol falling back from the line into the tank and so keeps the system primed.

Commissioning. The work to prepare a new site or new equipment ready for use including testing of equipment and preparing written instructions, initial training etc.

Competent person. A person with enough practical and theoretical knowledge, training and actual experience to carry out a particular task safely and effectively. The person should have the necessary ability in the particular operation of the type of plant and equipment with which he or she is concerned, an understanding of relevant statutory requirements and an appreciation of the hazards involved. That person should also be able to recognise the need for specialist advice or assistance when necessary, and to assess the importance of the results of examinations and tests on the light of their purpose. A ‘person’ can be taken to mean more than one, or a body corporate or incorporate. It is therefore possible to appoint appropriate organisations (e.g. insurance companies or inspection bodies) to carry out tasks designated for competent persons.

Constant monitoring. See monitoring systems.

Control point. A position in a kiosk or other building at an attended self-service site from which an attendant can adequately view and supervise activities at the dispensing equipment, activate the equipment and shut it off in an emergency.

Console. A control unit containing switches, keys or similar elements to control the operation and authorisation of petrol dispensers on service stations.

Dipping. Checking the level of the contents of a tank(s) by means of dip stick.

Dispenser (Refueling pump). A measuring system designed to draw fuel from a supply tank and dispense it into fuel tanks or approved containers.

Double skin tank/pipe (also double walled). A storage tank which is essentially a tank within a tank or pipe within a pipe, with a small space between the two. This space is called the interstice into which monitoring equipment can be fitted to continually monitor for leaks.

Emergency cut-off switch. A switching device for quick operation in cases of emergency to disconnect the electrical supply to all dispensers.

Equipment. Any machinery, pipework or device forming part of the site installation.

Fail-safe overfill prevention device. A device or system designed to automatically shut off and prevent a delivery of fuel overfilling a tank (or compartment of a tank) beyond its maximum working capacity.
Fuel point. The inlet through which the storage tank is filled from a road tanker.

Filling station. Premises at which petrol is sold to the public and is dispensed into the fuel tanks of motor vehicles or into containers.

Flame arrester. A device fitted to the opening of a petrol tank vent pipe to prevent flames entering the vent pipe and tank.

Full retention interceptor. A device installed in a surface water drainage system to separate out any petrol and thus prevent it reaching public drains, sewers or water courses and which has a capacity to retain an amount of petrol equivalent to a full delivery tanker compartment.

GRP. Glass reinforced plastic.

Hazard. Anything that can cause harm.

Hazardous area. An area where flammable or explosive gas or vapour-air mixtures (often referred to as explosive gas-air mixtures) are, or may be expected to be, present in quantities which require special precautions to be taken against the risk of ignition.

Interceptor (also known as Separator). A device installed in a surface water drainage system to separate out any petrol and thus prevent it reaching public drains, sewers or water courses.

Inertial. The space between the inner and outer skins of a double skinned pipe or tank.

Latched safety nozzle. A device for controlling the flow of fuel during a dispensing operation which can be locked into the ‘on’ position and left unattended.

Leak alarm system. A device which is capable of triggering an audible and/or visual alarm in the event of a leak being detected.

Maximum working capacity. The safe working capacity of a storage tank is defined as 97% as defined in Schedule 4 of the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992.

Monitoring system. An automatic system capable of detecting loss of product from tanks or pipework and providing warning of this.

Monitoring well. An observation well with monitoring equipment installed in the well to automatically sound an alarm if a leak enters the well.

Non-combustible material. Material which can be classified as non-combustible when tested for non-combustibility in accordance with BS 476 Part 4. Alternatively, material which when tested in accordance with BS 476 Part 11 does not flame and gives no rise in temperature on either the centre (specimen) or furnace thermocouples.

Nozzle. A device for controlling the flow of fuel during a dispensing operation.

Observation well. A slotted or screened tube or pipe, positioned vertically in the ground around an underground storage installation, that permits an operator to check conditions in the excavation to determine whether there may be a leak in the installation.

Off-set filling pipe. The filling point for a storage tank which is remote from the tank it fills.

Overfill prevention device. A device or system designed to automatically shut off and prevent a delivery of fuel overfilling a tank (or compartment of a tank) beyond its maximum working capacity.

Petrol or petroleum spirit. Petroleum which, when tested in accordance with the Petroleum (Consolidation) Act 1928, has a flashpoint of less than 27°C.

Petroleum Licensing Authority. See Appendix 4, Petroleum (Consolidation) Act 1928.
APPENDIX 7: Acknowledgements

HSE Petroleum Working Party members:

HSE
United Kingdom Petroleum Industry Association
Petrol Retailers Association
Union of Shop, Distributive and Allied Workers
Trade Union Congress
Association of County Councils
Association of Metropolitan Authorities
Gilbarco Ltd

Petroleum Licensing Authorities:

London Fire & Civil Defence Authority
West Yorkshire Fire & Civil Defence Authority
Gloucestershire Trading Standards Department
Warwickshire Trading Standards Department
Humberside Trading Standards Department

Site operators:

The 89 site operators who participated in the pilot for this guidance.