**Guidance for completing University Inspections**

**Introduction**

Inspection is considered an organised visual check. Please use the inspection check-list to direct your self-inspection. We advise you walk around your lab, with the checklist, completing it as you go. It is often valuable to include others in your inspection, such as laboratory workers and supervisors.

**How to use the checklist**

The checklist is broken down into various areas, where an area is not applicable, please indicate so. Each item can be rated A - F. Please refer to the table below to see the definitions for each score.

**University inspection ratings explained:**

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| --- | --- | --- | --- |
|  | Blue | Exemplary | No issues raised, ‘best practice’ observed |
|  | **Green** | **Very Good** | No Issues raised |
|  | **Green/Amber** | **Generally Good** | Issues raised, technical issues – not serious |
|  | **Amber** | **Areas for Improvement** | Issues raised, areas for improvement |
| **E** | **Red/Amber** | **Unsatisfactory** | Serious issue(s) raised, no immediate risk of harm/damage |
|  | **Red** | **Unacceptable** | Issue(s) of imminent danger, immediate rectification required or suspension of use of facility/equipment/procedure |

**Assigning actions**

Where improvements are needed then an action should be assigned and documented using the attached Findings Action Log. Best practice observations should be shared with others as a method of continuous improvement. Generally speaking, each action should be assigned to a named person and a date for action agreed.

The log should be used when:

* All ratings D - F must have an assigned action
* All ‘F’ ratings must be immediately notified to the H&S department and/or the Director of H&S.
* Exemplary practice (A) should also be noted and communicated to those involved.

**What next?**

Reports should be finalised and issued to the laboratory supervisor. Once reports are agreed these should be sent to your School/Department local H&S Committee for discussion if necessary.

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| **General Safety** | | |
| GS2 | | Suitable and sufficient generic risk assessments must be carried out for all standard work activities which present significant risk. Where it is a new activity, or the activity has changed, then the results of the assessment must be recorded in the approved manner. There is no need to record assessments which are ‘simple and obvious’ (easily and readily repeatable). *Management of Health and Safety @ Work regs* |
| GS3 - 5 | | Local lab rules need to be provided to all who work in the space. All projects / experiments must be subject to assessment and the findings should be recorded in the laboratory book. Sufficient detail should be provided regarding the potential hazards presented by the materials, the conditions necessary and the actions required. Where the work is subject to standard local rules, these rules must be referred to in the assessment. *University Policy* |
| GS 6 | | Safety signs are required to be displayed where the risks to health and safety cannot be avoided by other means or there is a residual risk present even with other control measures in place.  *The Health and Safety (Safety Signs and Signals) Regulations 1996* |
| GS 7 – 10 | | Good Housekeeping is vital in the prevention of many accidents and supports accuracy of experiments. Walkways must be kept clear and not used for storage. Chemicals should be returned to storage area when not in use. Balance areas must be kept clean and free from potential contaminants. Sinks should not be used to store items. Glassware should be returned to its storage location. |
| GS 11 | | To reduce the risk of overheating and the potential for a fire, all heat sources must be isolated when not in use *University Policy* |
| GS12 | | Equipment operating at pressures in excess of 0.5 bar above atmospheric pressure are required to be inspected, and maintained with records. Where the system contains steam, or the volume/pressure is in excess of 250 bar/l, then the system must be subject to Statutory Inspection - a written scheme of examination and tested in accordance with that scheme.  *Pressure Systems Safety Regulations* |
| GS13 | | Waste must be segregated and labelled for disposal. The areas must be appropriate and not likely to be interfered with as part of daily use of the laboratory |
| G14 | | In order to prevent cross contamination and the potential for health effects, food and drink must not be consumed with the laboratory. |
| **Facilities and Equipment** | | |
| F1-F3 | | Facilities to wash hands must be maintained in a clean condition with suitable products to clean and re-moisturise the skin available. |
| F4 – F6 | | Surfaces must be sealed in order to minimise the risk of cross-contamination. |
| F7 | | All shelving should be secured to its location and of sufficient strength for the materials it holds. |
| F8 | | All portable electrical equipment is required to be inspected and tested on a regular basis. The time period between the inspections and test is determined by assessment. All equipment should be tagged indicating when the next test is due and records maintained. |
| F9 | | Socket and extension leads should not be overloaded in order to reduce the risk of an electrical fire, and leads must not trail over a walkway or impede on a work area. |
| F10 | | Clean incubators minimise risk of contamination. |
| F11 | | Users of computer equipment must know how to set up the equipment correctly and have carried out a work station assessment. Full details and guidance can be found on the health and safety website. |
| F13 | | Moving parts of machinery must be guarded to prevent inadvertent contact |
| F14 & 15 | | Equipment should be inspection regularly to ensure it is clean and fit for purpose |
| F16 - 18 | | Fridges should be fit for purpose, spark proofed, clean and tidy. Boxes should be used to minimise the risk of breakage, spillage and potential cross contamination. All items should be labelled indicating experiment and owner. The fridge should display its ideal operating temperature and a thermometer available to check compliance |
| **Emergency** | | |
| E2 | | Emergency action and first aid information should be readily visible *Fire Safety Order,*  *H&S (First aid) regs* |
| E3 | | Means of egress needs to be free from obstructions and doors easily operable  *Fire Safety Order* |
| E4-6 | | In accordance with the current code of practice – BS 5306 portable fire extinguishers should be appropriate to the risk, sited in a suitable location – preferably near to an exit door, secured to their location and kept free from obstructions and maintained at least every 12 months. |
| E7 | | Researchers who work with flammable solvents or water and air reactive compounds must be trained in the correct use of fire extinguishers. |
| E8 | | First aid kits are required to be stocked in accordance with the risk assessment. Suitable provision must be made to ensure the replenishment stock is available. *H&S (First aid) regs* |
| E9 | | Facilities need to be provided (Emergency shower or running water) to deal with personal contamination by a potentially hazardous material. Where there is potential for contaminants to enter the eye, eyewash must be made available and in date where running water is not immediately available) *H&S (First aid) regs* |
| E10 | | Where potentially hazardous materials are being used/handled, there must be provision to deal with any spillages of that material. The spillage kit should be able to contain and absorb liquid spills and provide a medium for its disposal and also have provision for the collection and disposal of dry spillages. *Duty of Care (EPA)* |
| E11 | | Where mercury is available / used within the laboratory (this includes mercury thermometers), then the location of the mercury spill kit should be publicised. |
| E12 | | First aiders should be aware of special requirements for specific high hazard materials, and this provision should be available in the lab in which it is being used.  *H&S (First aid) regs* |
| **Chemicals** | | |
| C2 | | When the chemicals are no longer required for the current experiments, they should be returned to a store and the laboratory inventory updated. (There will be commonly used chemicals which would normally be expected to be available, and these should remain on the inventory) |
| C3 | | OpERA ordering system requires high hazard materials to be identified during the purchase. Check for evidence of compliance where applicable |
| C4 | | General housekeeping – prevents cross contamination and minimises the risk of accident. |
| C5 | | The Classification and Labelling regulations (CLP and CHIP) requires that all substances classified as hazardous to health must be appropriately and clearly marked with the relevant safety symbols, risk and safety phrases (hazard and precautionary statements under CLP) |
| C6 | | It is good practice to record on the container the date of receipt, especially for substances which have a limited shelf or usage life. |
| C8 & 9 | | Chemical storage cabinets need to be able to contain 110% of the largest container and should be made of a material appropriate to what is being stored. Consideration should also be given to amount of storage and the effect on the containment capacity. |
| C10 | | Highly flammable liquids (those with a flashpoint below 32⁰C) are restricted to a maximum storage volume of 50 litres and stored within cabinets suitable for highly flammable liquids. This limit is exempted when a suitable ‘solvent safe’ is provided. DSEARegs |
| C11 | | The container size of the working flammable liquid should not exceed 500 ml DSEARegs |
| C12 | | There must be no ignition sources available close to highly flammable materials (This includes materials stored and in use) |
| C13 | | Storage of chemicals above head height give rise to a greater risk of an accident |
| C14 | | In order to prevent spillage and the potential for inadvertent reactions, containers must be kept closed unless actually being used |
| C15 | | A safe method of carrying Winchesters should be adopted. This can be a purpose designed carrier or a trolley when more than two Winchesters need to be moved. For larger volume transfers, a fireproof trolley should be used. |
| C16 | | Winchester storage is often observed to be the lab floor. This is not good lab practice. Good housekeeping practices reduce the risk of a trip and the potential for substance spillages |
| C17 | | In order to reduce the risk of fire and explosion, water and air reactive materials must be stored under an inert atmosphere or liquid |
| C18 & 19 | | In order to the reduce the risk of a incident, the amount of waste accumulation needs to be kept to a minimum and the type wastes need to be appropriately segregated according to their reactivity. *(Duty of Care Regs, EPA)* |
| **Gases** | | |
| Common use gases must be piped in from outside with appropriate regulators used within the lab space for the local delivery of the gas. However, there are occasions where ‘Special Gases’ are required to used, hence in these situations, a small cylinder of the relevant gas is allowable in the lab space with the proviso that its use is short duration, - ie no longer than 6 months. The cylinder must be returned to the gas compound when the gas is not actually in use. | | |
| G1 | | Where cylinders are available within the lab, whether or not a actually being used, there needs to be an indication of the cylinders presence at the entrance to the lab. This is normally a colour coded cylinder tag |
| G2 | | Cylinders need to be secured to the location either by a clamp or stand |
| G3 | | Regulator needs to be suitable for the type of gas and the required delivery pressure |
| G4 | | The body of the regulator should display the date of manufacture. They must not be more than 5 years old. |
| G5 | | Visual check for secure connections. Ideally the connections are Swagelok or other engineered fittings. |
| G6 | | Check for mechanical damage and perish |
| G7 | | The contents of the cylinder must be readily visible |
| G8 | | Empty cylinders and cylinders not actually in use must be removed from the lab space and returned to the gas cylinder compound. This is to reduce the fire loading and/or explosive risk in the space. |
| G9 | | Correct segregation of gases is required to reduce fire risk |
| **Fume Cabinets and Microbiological Safety Cabinets (MSC’s)** | | |
| CA1 | | Cabinets operate more effectively with less items interfering with the airflow. Only items which are required for the current experiment should be available. All other items should be removed to their appropriate storage location. |
| CA2 | | Avoid placing large pieces of equipment in the cabinet, they interfere with the  aerodynamic flow and may reduce the effectiveness of the cabinet. If their use cannot be  avoided they should be raised up about 100mm using laboratory jacks, in order to allow air  to pass unimpeded across the work surface and exhaust from rear of the cabinet.  *(Good fume cupboard practice )* |
| CA3 | | Equipment in the cabinet should be kept to a minimum and sited at least  150mm inside the plane of the sash to ensure efficient containment. Experimental evidence has shown that if contaminants are released in this area there is a higher possibility of them being drawn out of the cupboard by convection currents caused by operator movements. The sash needs to be able to be closed quickly in an emergency.  *(COSHH guidance)* |
| CA4 | | The front sash should be lowered when an experiment is taking place. This reduces the energy usage for the cupboard and also protects laboratory workers in the event of an incident. |
| CA5 | | All LEV systems are required to have a test at least every 14month by a competent person and the results should be available on the LEV or close to its controls.  *(COSHH r. 9)* |
| CA6 | | MSC’s require validation to ensure performance |
| CA7 | | Is there evidence of air flow checks |
| **Personal Protective Equipment** | | |
| PE1 & 2 | | The general risk assessment for the laboratory and its activities should provide a range of control measures to minimise the risk to the users. However, a range of PPE suitable for the tasks should be available and worn to protect for unplanned occurrences. Where the PPE is available in a range of sizes, then sizes appropriate to the staff present should be made available  Where there is a risk of injury to the eyes, eye protection must be provided and worn. Normal prescription spectacles will not give adequate protection but may be worn under many other types of eye protection. Specialist eye protection should be available for laser areas etc.  Lab coats worn in labs which handle chemicals. |
| PE3 | | General use disposable gloves are for protection against inadvertent splash only. When handling larger quantities of chemicals ensure the materials of glove is suitable for the chemical being handled. Breakthrough time guidance is available on the health and safety website. |
| PE4 | | Where the PPE is not single use, there needs to be provision for the clean storage of the equipment. |
| PE5 | | Where RPE has been identified in the risk assessment, the users must be trained in face fit testing |
| **Biosafety** | | |
| B1 | | All Facilities must be either; legacy facilities, those in use prior to 2010 or have been approved by GMBSC |
| B2 | | All biological work, including GM must be approved by GMBSC. Please see the University Biosafety webpages for additional information |
| B3 | | There must be suitable, primary engineering controls to contain infectious and GM materials, as to prevent harm to laboratory workers or inadvertent escape. |
| B4 | | Biological waste must be segregated into appropriate colour coded bags for downstream processing. The requirements will be set by your School/Department. |
| B5 | | Disinfectants are used for make-safe and in the event of a spillage and should be detailed in the risk assessment. Any disinfectant should be appropriate for the task and be proven to be effective against the organisms in use. When using multiple organisms, the most robust disinfectant should be used for all organisms in use. It is also important to consider application, concentration, environment and compatibility. |
| B6 | | Disinfectants usually have a short shelf-life once made to working concentrations. Disinfectants should be labelled as to ensure that the active compound is still effective |
| B7 | | Surfaces should be regularly disinfected to ensure that any micro-spillages or inadvertent cross-contaminated is reduced. Is it strongly recommended the working benches are cleaned after each use |
| B8 | | Spillage kits should be available and appropriate to the risk. Kits should include appropriate disinfectant at a suitable concentration, PPE and equipment for safely cleaning up the spillage. |
| B9 | | Staff should be trained to respond to a spillage in the most effective manner |
| B10 | | Biohazard signs and an indication as to the containment level of the laboratory should be displayed at the entrance. |
| B11 | | Access should be restricted to authorised staff who are aware of the risks. This can be at the laboratory level or at the suite/building level for areas where there are multiple biological containment laboratories. |
| B12 | | All infectious and GM materials must be stored safely at all times. Either in an incubator or fridge/freezer. Each should be in a suitable primary container and ideally be in a secondary layer of containment such as a box. |
| B13 | | Autoclaves used for sterilisation must be tested via thermocouples by a competent engineer on an annual basis to BS2646 |
| **Laser Safety** | | |
| L1 | | All work involving use of high power lasers (Class 3B and Class 4) must be subject to a risk assessment. |
| L3 | | Safe working procedures must be written and available for reference, for normal operation and maintenance including beam alignment. |
| L3 | | There should be a list available for inspection of persons authorised to work with lasers. A record of workers’ training should be available for inspection, or an indication of the person responsible for authorising a worker as competent. |
| L4 | | Laser hazard warning signs conforming to IEC 60825-1 must be displayed. |
| L5 | | There should be restricted entry to high hazard laser areas. |
| L6, L7, L8, L9, L10 | | Best practice is to use engineered controls to prevent accidental exposure to a laser beam. Engineered controls include totally enclosing laser-emitting instruments, use of beam covers and beam stops, fixed or portable physical access barriers and screens. Interlocking may be used to prevent laser discharge when, for example, access doors are opened or beam housing is removed. |
| L11 | | Lasers often involve use of high voltages and electrical hazards can present a greater risk than laser beams themselves. Electrical supply, wiring and circuitry should be fitted and maintained to meet BS requirement. |
| L12 | | Trip hazards from electric cables, cooling system pipework, miscellaneous floor standing equipment and furniture should be controlled. |
| L13, L14, L15 | | Best practice is to design and orient laser applications to minimise the risk of accidental eye exposure from a direct beam hit and/or from specular or diffuse reflection. |
| L16, L17 | | There may be laser applications where after engineering and other control measures have been put in place there is a residual risk of accidental eye exposure. In which case laser protective eyewear should be available. Psotective eyewear must conform to BS EN 207:2009 (laser protection) and BS EN 207:2009 (laser alignment). The level of protection provided must be adequate for the laser used e.g. CW or pulsed, wavelength and power density. |
| L18 | | Flood risk from water cooled lasers is often overlooked. Coolant supply shut-offs should be available, pipework and connections should be checked and maintained, risk of accidental coolant leaks coming into contact with electrics should be prevented – e.g. by sensible routing of pipework, raising electrics above potential flood points, insulation. |
| L19 | | Pressurised gas may be used in laser applications. Guidance provided for Gases apply. (G1-G9 this document) |
| L20 | | Potentially harmful substances arising from laser applications may be generated. These should be considered as would any other substance potentially harmful to health i.e. *COSHH regulations* apply and appropriate controls should be in place. |
| **Radioactive Substances (open sources)** | | |
| R1 | | Work involving use of open source radioactive substances must be risk assessed *(IRR99, EPR11),* risk assessments must be relevant and up-to-date (are there review dates?) |
| R2 | | Standard operating procedures (‘Local Rules’) should be available for inspection. |
| R3 | | Radioactivity hazard warning signs must be clearly visible on, for example, entrance doors, designated laboratory areas, sample storage cabinets, radioactive sample containers, equipment incorporating or used for work with radioactive material, radioactive waste disposal containers and waste storage areas. |
| R4 | | Is it possible to identify and contact the area RPS if necessary? |
| R5 | | Access to Supervised areas should be restricted to authorised workers, access to Controlled areas is restricted to Classified workers or to staff working with controls described in a Local Rule, aimed at preventing exposure. |
| R6 | | General housekeeping should be of high standard, indicating that consideration has been made of factors which could contribute to unwanted exposure and unwanted contamination |
| R7 | | Work with radioactive materials where present a risk of internalisation by inhalation, must be performed in a designated exhaust ventilated area. |
| R8 | | Designated areas must have hand wash basin at the exit |
| R9 | | Workers must use PPE which minimises risk of contamination of the person and clothes. |
| R10 | | Personal dosemeters should be used on a risk basis i.e. users of tritium and carbon-14 are highly unlikely to require, users of phosphorus-32 are likely to require. Unnecessary use is deterred. |
| R11, R12, R13 | | Contamination monitors and rate-meters must be appropriate for the radionuclides in use, they should be in working order (no flat batteries) and there should be indication of a valid annual test and calibration. Contamination monitoring records should be available for inspection with clear evidence of regular area monitoring and evidence that follow-up action was taken where (if) contamination was found. |
| R14, R15 | | Radiochemical sample storage cabinets should be locked unless in use and have a radiation hazard warning trefoil visible on the outside. Ideally storage cabinets should be dedicated for radioactive samples. If this is not possible shelves or compartments inside the cabinet should be used to keep radioactive active and non-radioactive materials separate, with relevant labelling. Radioactive materials must never be stored along with flammable solvents. |
| R16, R17 | | Radioactive materials must be clearly identified as such and in the case of radiochemical samples they must bear the unique isostock reference number or some other traceable identifier. Source inventories should be up-to-date and there should be an accurate match between the accounting system inventory and available samples. |
| R18, R19, R20 | | Disposal of radioactive waste must be in compliance with conditions set in the EA permit. Waste must be streamed correctly, waste disposal containers must be labelled correctly, aqueous waste disposal sinks must be designated and labelled as such and waste must not accumulate for longer than stipulated in the EA permit |
| **Radiation (X-rays and sealed radioactive sources)** | | |
| RX1 | | Work involving use of open source radioactive substances must be risk assessed *(IRR99),* risk assessments must be relevant and up-to-date (are there review dates?) |
| RX2 | | Standard operating procedures (‘Local Rules’) should be available for inspection. |
| RX3 | | Radioactivity hazard warning signs must be clearly visible on, for example, entrance doors, designated laboratory areas, equipment capable of generating radiation or incorporating radioactive sealed sources. Sealed radioactive sources must be labelled and storage containers for radioactive sealed sources must be labelled. |
| RX4 | | Is it possible to identify and contact the area RPS if necessary? |
|  | | Access to Supervised areas should be restricted to authorised workers, access to Controlled areas is restricted to Classified workers or to staff working with controls described in a Local Rule, aimed at preventing exposure. |
| RX6 | | Engineered controls should be used to minimise risk of accidental radiation exposure from X-ray equipment, such as use of enclosures, screens, physical access barriers. |
| RX7 | | Audible and or visual alarms should be fitted to X-ray generating kit, to warn when X-rays are generated. |
| RX8, RX9 | | Interlocks and other fail-safe mechanisms should be used where it is appropriate to engineer out the risk of radiation exposure. There should be evidence that interlocks are on a maintenance schedule. |
| RX10 | | Standard laboratory PPE is usually appropriate but there may be cases (e.g. radiology lab) where use of leaded PPE is recommended. |
| RX11 | | For some work with X-ray generating kit the use of personal dosemeters may be appropriate. The need for should be identified in the risk assessment. |
| RX12, RX13, | | Contamination monitors and rate-meters must be appropriate for the type of radiation. they should be in working order (no flat batteries) and there should be indication of a valid annual test and calibration. Records should be available for inspection with clear evidence of regular stray field monitoring and evidence that follow-up action was taken where (if) radiation leakage was found. |
| RX14 | | Sealed source stores must be labelled with a radiation hazard warning trefoil sign but not to an extent that draws attention to the location, counter-productive for security. The store must be locked. |
| RX15 | | Individual sealed sources must have a unique identifier and be traceable to an inventory. |
| RX16, RX17 | | Sealed source disposal should be arranged as soon as a source is no longer wanted. Staff should be aware of arrangements for disposal of sealed sources i.e. contact the University Radiation Protection Officer in the first instance. |
| **Cryogenic Gases** | | |
| CG1, CG2 | | Work involving materials liking to cause severed cold burn and asphyxiation must only be carried out by person train in the correct procedures. |
| CG3 | | Suitable gloves must be provided which must be capable of being readily removed. A face shield or goggles which offer protection to |
| CG4 | | All systems with a capacity of 250 bar litres and operates at 0.5 bar above atmospheric are covered by the Pressure Systems Safety Regulations and will require a Written Scheme of Examination and be subject to statutory testing. |
| CG5 | | Under no circumstances can people travel in a lift carrying liquid cryogenics. The co-efficient of expansion is sufficient to displace the oxygen resulting in asphyxiation. |
| CG6 | | Where the cryogens are used in a space where there is the potential to displace the oxygen in the event of a release of the gas – such as a magnet quench, then oxygen depletion monitoring is required. The monitoring system will require regular checking and maintenance. |
| **Nano Materials** | | |
|  | | The health and safety implications of working with nano materials is not fully understood, it is a relatively new area of research. Hence precautions must be taken to minimise risk of exposure. Consider the state of the material (Solid, Liquid). Can it become airborne? Work with Nano materials in HEPA filtered cabinets where necessary. Keep a register of spaces carrying out nano work and ensure risk assessments are adequate. |
| **Magnetic Field e.g. NMR, MRI,** | | |
| M1 | | Work involving use of equipment capable of generating high magnetic field must be risk assessed, risk assessments must be relevant and up-to-date (are there review dates?) |
| M2, M3, M4 | | Suitable warning must be displayed at a safe distance away from magnetic fields typically at an entrance door to an area. The warning should notify of restricted access to workers at particular risk and of exclusion zones on use of ferromagnetic objects. There should be arrangements whereby staff have to check for and remove from the person ferromagnetic items e.g. watches, jewellery, keys. |
| M5 | | Exposure Level Values (ELV) and Action Levels (AL) have been set (Directive 2013/35/EU) for minimum safety requirements regarding the exposure of workers to the risks arising from electromagnetic fields. This is a complex area. As a rule of thumb workers should not be exposed to field strengths greater than 200mT on a whole body time-weighted basis. Similarly, access should be restricted to areas where workers could be receive more than 2T instantaneous whole body exposure, this is increased to 5T limit for limbs only. Field strengths in Tesla are relatively easy to measure and it is good practice to map out and mark field strengths around sources |
| M6 | | The consequences of a magnet quench must be considered in the risk assessment and contingency measures must be prepared and readily available. Workers in the area must be instructed in the procedure to take in the event of a quench. |
| **Premises** | | |
|  | | The work space needs to be suitable for the type of activities being carried out and suitable for the workers in that space. |
| **Department Specific - Chemistry** | | |
| DC1 & 2 | The Department of Chemistry safety handbook is issued to all undergraduates, postgraduates etc. at the start of the new academic year. All staff and students should have a copy readily available. There needs to be confirmation using the ‘blue form’ of agreement to work safely.  *University Policy* | |
| DC3 & 4 | Vacuum lines and associated apparatus should be protected in the event on an implosion. This can be in the form of a plastic coating on the glassware or a mesh. | |
| **Department Specific -** | | |
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