**Green Impact - Queen's University - Labs**

| **Ref** | **Criteria** | | **Further Information** | **How will you be audited** | | | **Notes** |
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| **Criteria Theme - Chemicals and Materials** | | | | | | | |
| L001 | All chemical containers are labelled with details of contents, approximate quantity, ownership, and (where relevant) hazard and emergency details, in a manner which can be understood by others if the ‘owners’ are not available. | Chemicals and materials usage can often be significantly reduced, with financial and health and safety as well as environmental benefits. The latter include avoided impacts from chemicals and materials production, and reduced volumes of waste. The starting point for almost all measures to achieve these is knowing exactly what is in the laboratory. Labelling is a prerequisite for this, and of course is also important for health and safety reasons | | | Personal observation – no unlabeled containers, no labels that are impossible to decipher etc. NB Chemicals may be contained in a central Chemical Store, in which case the assessment can be done once for all labs. | * **Centralised stores provide a tracking system for chemicals** * **Each lab has a system for labelling chemicals in line with the School H&S policies** | |
| L002 | The contents, approximate quantity held and location of all chemical containers are tracked. | This is another important prerequisite for improvement actions, as well as being important for health and safety reasons. | | | Evidence of concrete measures to achieve this, e.g. database. | Stores tracking system  Quill tracking system  Centacat tracking system | |
| L003 | The laboratory avoids accumulation of unwanted chemical stocks, e.g. by making surplus chemicals available to other laboratories, by ordering in appropriate sizes, by clearing out when researchers leave. | Many laboratories have large quantities of surplus chemicals, which often end up being disposed of as waste, at considerable cost. Often too one lab wil be ordering chemicals which are actually surplus to requirements in another. Internal exchanges can not only minimise this, but also save money on procurement and improve performance because researchers don’t have to wait for chemicals to be delivered. Ordering in smaller sizes can also be beneficial by reducing health and safety risks and tying up less money in stocks. | | | Evidence of concrete measures to achieve this, e.g. regular email requests/offers, participation in department-wide chemical management system, ordering in small sizes. Interview with lab user(s). NB Criteria not met if any chemicals or materials were sent to waste for reasons that were avoidable (e.g. not using before end of useful life) in the previous 12 months. NB Chemicals may be contained in a central Chemical Store, in which case the assessment can be done once for all labs. | Central lab stores   * **swapping chemicals policy** * **swapping chemicals system** * **training** | |
| L004 | Chemicals and materials are used efficiently within laboratory demonstrations, experiments and other activities so that waste is minimised. | Efficient use is not only important for the environmental and financial performance of the laboratory, measures to achieve it can also send important messages to students and new researchers. | | | Interview with lab user(s). Evidence of action, e.g. laboratory handbook or awareness materials promoting efficient procedures, making up stock solutions for use by multiple users. | Multiple user stock – quill  Efficient use centacat | |
| L005 | All chemicals are stored in Health and Safety approved locations that are safe and secure | It’s obviously important to avoid the potential risk of spillage or emissions of chemicals to the atmosphere. | | | Evidence of a storage policy based on health and safety assessment(s). No problems with solvent evaporation in summer. Interview with lab user(s). NB This point can’t be awarded if chemicals are stored in fume cupboards or containment devices for prolonged periods (see criteria FC6) | * **Results of safety surveys for labs involved** | |
| L006 | There has been a systematic attempt to find alternatives to especially environmentally damaging or hazardous chemicals. | Substitution of chemicals by less hazardous alternatives can reduce health and safety risks, environmental impacts and costs (e.g. through avoided special waste costs). Some environmentally damaging or hazardous chemicals in common use are also capable of misuse by terrorists. | | | Knowledge of which chemicals are especially environmentally damaging or hazardous. | * **Training** * **List of environmentally hazardous chemicals** | |
| **Criteria Theme - Cold Storage** | | | | | | | |
| L007 | All stored materials are permanently labelled with details of contents, expiry and ownership, in a manner which can be understood by others if the ‘owners’ are not available. | Cold storage devices are highly energy intensive – they can account for up to 5% of total laboratory energy consumption, and also create indirect consumption because their heat generation often requires additional cooling from ventilation air. They also take up floor space that could be used for other purposes. S-Lab research suggests that some of these impacts are unnecessary because unwanted or obsolete samples are being stored. Labelling is a prerequisite for avoiding this, and of course is also important for health and safety and regulatory compliance reasons | | | Personal observation. | Storage Policy see LG001 | |
| L008 | All stored materials are associated with active uses, or are being kept because of specific archiving requirements. | Cold storage devices are highly energy intensive – they can account for up to 5% of total laboratory energy consumption, and also create indirect consumption because their heat generation often requires additional cooling from ventilation air. They also take up floor space that could be used for other purposes. S-Lab research suggests that some of these impacts are unnecessary because unwanted or obsolete samples are being stored. Labelling is a prerequisite for avoiding this, and of course is also important for health and safety and regulatory compliance reasons | | | Evidence of a system (hand-written or digital) which tracks the location of stored materials. | Stores stock packages   * **Fridge survey as part of lab environmental management system** | |
| L009 | Stored samples and materials are stored at the highest feasible temperature for effective preservation. | Many biological samples are being stored at higher temperatures than necessary (e.g. ultracold freezers are often set to maximum settings such as -80C when -70 would be sufficient). Ambient temperature DNA storage technologies are also available. | | | Evidence of written policies/guidance on storage temperatures. Interview with lab user(s). NB Check if ultracold devices are set to lowest possible temperature and, if so, whether there is a clear rationale for this. | * **Policy on fridge usage and environmental induction** | |
| L010 | All available space is utilised through use of appropriate racking, storage containers etc. | Many cold storage devices store fewer samples than they are capable of because of awkwardly shaped containers, poor racking etc. This is not only inefficient but also threatens sample longevity because there is more ingress of warm air when doors or lids are opened. | | | Evidence of use of modular or other devices to maximise space utilisation. Personal observation. | * **survey** | |
| L011 | There is regular (at least annual) cleaning, defrosting and (for ultracold freezers) maintenance of devices. This includes cleaning heat exchange coils on fridges and freezers, and defrosting of any devices without auto-defrost. | The energy consumption of cold storage devices rises if circuits or interiors are frosted, or if they are not working effectively. | | | Interview with lab user(s). Evidence of maintenance contracts for ultracold devices. | **\* Policy for fridges & freezers** | |
| L012 | Energy costs of new cold storage devices are quantified and incorporated into a whole life costing approach to new purchases. | When the lifetime energy costs are taken into account, it can be very cost effective to purchase more expensive energy efficient cold storage devices. Vendors should be able to provide consumption information although it is important to check that the operating conditions this is gathered under are the same as your laboratory. Estates staff may be able to provide support for the incremental cost differences between ordinary and efficient devices. | | | Interview with lab user(s) and, possibly, procurement staff. Evidence that energy costs were considered in any purchases over the last 12 months, either directly or indirectly by purchasing from a scheme which has done this. NB If no recent purchases, treat as non applicable. | * **Stores staff look for the most cost effective – energy efficient option in line with the QUB Supplier Support Guidelines** | |