# SSERC logo

**SSERC Risk Assessment** (revised version March 2018)

(based on HSE’s INDG 163 ‘Risk assessment - A brief guide to controlling risks in the workplace’)

2 Pitreavie Court, South Pitreavie Business Park, Dunfermline KY11 8UU

tel : 01383 626070 e-mail : [enquiries@sserc.org.uk](mailto:enquiries@sserc.org.uk) web : [www.sserc.org.uk](http://www.sserc.org.uk)

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| Activity assessed | Testing water for boron |
| *Date of assessment* | 30th June 2020 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | | | |
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| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | | | |
| *by whom?* | | *Due date* | | *Done* |
| Sodium tetraborate is a reproductive toxin.  Sodium tetraborate solutions have no significant hazards. | Technician preparing solutions. | Wear gloves and eye protection, avoid raising dust. |  |  | |  | |
| Tumeric has no significant hazard.  Ethanol is flammable | Technician preparing solutions | Keep away from sources of ignition. Wear gloves and eye protection. |  |  | |  | |
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| **Description of activity:**  A solution of turmeric in ethanol is used as an indicator as it goes red in the presence of boron. Reference solutions of sodium tetraborate are made up and tested, the colours analysed by a colorimeter. Samples of water are tested in the same way and compared with the reference graph |
| **Additional comments:** |

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| Activity assessed | Testing water for Calcium and Magnesium |
| *Date of assessment* | 30th June 2020 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | | | |
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| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | | | |
| *by whom?* | | *Due date* | | *Done* |
| EDTA is a skin, eye and respiratory irritant | Technician preparing solutions. | Wear gloves and eye protection. Avoid raising dust. |  |  | |  | |
| Sodium hydroxide is corrosive  1M sodium hydroxide solution is corrosive | Technician preparing solutions  Technician, teacher or pupils by splashes | Wear gloves and goggles (EN166 3).  Wear goggles (EN166 3). |  |  | |  | |
| Ammonia .880 is corrosive and the fumes are toxic (Cat 3)  The ammonia buffer is corrosive and gives off toxic fumes (Cat 3) | Technician preparing buffer solution.  Technician, teacher or pupils by splashes or inhaling fumes | Wear gloves and goggles (EN166 3). Handle in a fume cupboard  Wear goggles (EN166 3). Work in a well-ventilated area and keep lid off bottle for as short a time as possible. |  |  | |  | |
| Eriochrome black T is an eye irritant  Ethanol is flammable  Hydroxylamine hydrochloride is harmful by ingestions/skin contact, a skin/eye irritant, a skin sensitiser a category 2 carcinogen and can damage organs on repeated exposure. | Technician preparing solution.  Technician preparing solution.  Technician preparing solution. | Wear eye protection. Avoid raising dust.  Keep away from sources of ignition. Wear gloves and eye protection.  Wear gloves and goggles (BS EN166 3). |  |  | |  | |
| Murexide indicator (ammonium purpurate) has no significant hazard |  |  |  |  | |  | |
| Eriochrome Black T indicator solution is a skin sensitiser and a category 2 carcinogen. | Technician, teacher or pupils by splashes | Wear gloves and goggles (EN166 3). |  |  | |  | |
| The reaction mixture is of no significant hazard. |  |  |  |  | |  | |

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| **Description of activity:**  Water samples are titrated against EDTA solution. Using murexide and eriochrome black T indicators. The solution is made alkaline by pH 10 ammonia buffer for the total hardness or sodium hydroxide for the calcium only – which allows calculation of magnesium concentration. |
| **Additional comments:** |

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| Activity assessed | Testing water for carbonates |
| *Date of assessment* | 30th June 2020 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | | | |
| *by whom?* | | *Due date* | | *Done* |
| Lead nitrate (solid and the saturated solution) is harmful by ingestion or skin contact. It is also a reproductive toxin and repeated exposure can cause organ damage. | Technician preparing solutions  Technician, teacher, pupil by splashes | Avoid raising dust. Wear gloves and goggles (EN166 3)  Wear gloves and goggles (EN166 3) |  |  | |  | |
| Sodium hydrogen carbonate is of no significant hazard. |  |  |  |  | |  | |
| Reaction mixture is a reproductive toxin | Technician, teacher, pupil by splashes | Wear gloves and goggles (EN166 3) |  |  | |  | |

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| **Description of activity:**  Lead nitrate is added to water samples causing a precipitate of lead carbonate. This causes turbidity in the water that can be measured with a colorimeter. |
| **Additional comments:**  Lead compounds are hazardous to the environment.  Collect the reaction mixtures, add excess sodium carbonate or hydrogen carbonate solution to precipitate any remaining lead ions in solution, filter and keep the residue for disposal by a licensed contractor. |

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|  |  |
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| Activity assessed | Testing water for iron |
| *Date of assessment* | 30th June 2020 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | | | |
| *by whom?* | | *Due date* | | *Done* |
| Sulphuric acid is corrosive  1 mol l-1 sulphuric acid is irritant to skin and eyes | Technician preparing solutions, by splashing.  Technician, teacher, pupils preparing diluted reference solutions, by splashing. | Wear gloves and goggles (EN166 3)  Wear gloves and eye protection. |  |  | |  | |
| Iron III ammonium sulphate is a skin/eye irritant  The reference iron solutions are of no significant hazard | Technician preparing solutions, by splashing. | Wear gloves and eye protection. |  |  | |  | |
| Ammonium thiocyanate is harmful by ingestion, skin contact and inhalation.  1 mol l-1 Ammonium thiocyanate solution is of no significant hazard. | Technician preparing solutions | Avoid raising dust. Wear gloves and eye protection. |  |  | |  | |

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| **Description of activity:**  Solutions of known iron concentration as well as unknowns are reacted with ammonium thiocyanate. This results in a red compound. The reference samples are read in a colorimeter and a reference curve is constructed which is used to determine the iron concentration in the water samples. |
| **Additional comments:** |

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|  |  |
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| Activity assessed | Testing water for Nitrate and nitrite |
| *Date of assessment* | 30th June 2020 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | | | |
| *by whom?* | | *Due date* | | *Done* |
| Sulphanilic acid is a skin/eye irritant and a skin sensitiser.  Sulphanilic acid solution 0.5% is of no significant hazard | Technician preparing solution. | Wear gloves and eye protection. |  |  | |  | |
| Phenol is toxic (Cat 3) by ingestion, inhalation or skin contact. It is corrosive, a mutagen (Cat 2) and repeated exposure can damage organs.  0.5% phenol is of no significant hazard | Technician preparing solution. | Use in fume cupboard or well-ventilated room. Wear gloves (not nitrile) and goggles (BS EN16 3)  *To minimize inhalation of vapour, lid should be replaced immediately after use and it should be used in a well-ventilated room.* |  |  | |  | |
| Sodium hydroxide is corrosive  1 mol l-1 sodium hydroxide solution is corrosive | Technician preparing solutions  Technician, teacher or pupils by splashes | Wear gloves and goggles (EN166 3).  Wear goggles (EN166 3). |  |  | |  | |
| Potassium nitrate III (nitrite) is toxic if ingested (Cat 3) and an eye irritant. It is also an oxidiser | Technician preparing solutions | Avoid raising dust. Wear gloves and eye protection. |  |  | |  | |
| Zinc powder is flammable | Technician preparing reagent by burning | Keep away from sources of ignition |  |  | |  | |
| Potassium chloride and the 50 ppm solutions of nitrate III and V are of no significant hazard |  |  |  |  | |  | |
| Potassium nitrate V is a skin, eye and respiratory irritant. It is also an oxidiser | Technician preparing solutions | Wear eye protection. Avoid raising dust. Keep away from flammable materials. |  |  | |  | |

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| **Description of activity:**  Nitrates III (Nitrites) are measured by comparing the intensity of a yellow azo-dye compared with a graph from reference samples.  Nitrates V are reduced to nitrates III by zinc powder (mixed with potassium chloride) and then the azo dye is formed in the same way as above. |
| **Additional comments:**  The reduction of nitrate by zinc is not a complete process but it does seem to be proportionate. Do not compare results to a nitrate III reference graph, rather make dilutions of nitrate V and reduce them with the zinc to create your reference curve.  Zinc is harmful to the environment. Collect the reaction mixtures and filter the zinc powder out. Keep it for disposal by a licensed contractor. |

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| Activity assessed | Testing water for phosphate |
| *Date of assessment* | 30th June 2020 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | | | |
| *by whom?* | | *Due date* | | *Done* |
| Potassium antimonyl tartrate is harmful by ingestion and skin contact.  0.00844M solution has no significant hazard. | Technician preparing solutions. | Wear gloves and eye protection |  |  | |  | |
| Sulphuric acid is corrosive  2.5 mol l-1 sulphuric acid is also corrosive | Technician preparing solutions, by splashing.  Technician, teacher, pupils preparing diluted reference solutions, by splashing. | Wear gloves and goggles (EN166 3)  Wear gloves and goggles (EN166 3) |  |  | |  | |
| Ammonium molybdate has no significant hazard |  |  |  |  | |  | |
| Sodium phosphate is corrosive.  Potassium phosphate is a skin/eye irritant  Phosphate solutions and the reaction mixture are of no significant hazard | Technician preparing solutions.  Technician preparing solutions. | Avoid raising dust. Wear gloves and goggles (EN166 3)  Avoid raising dust. Wear gloves and eye protection |  |  | |  | |
| The combined reagent is a skin/eye irritant | Technician, teacher, pupils by splashing. | Wear gloves and eye protection. |  |  | |  | |

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| **Description of activity:**  Samples of water and phosphates of known concentration are incubated with the reagent. The presence of phosphate produces a blue complex. This is determined by colorimeter and the results for water compared with the reference curve. |
| **Additional comments:** |