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| **RA-019 RISK ASSESSMENT** | **Use of Arc Welding Equipment** | | **Frequency and Job Specific Information:** Please Refer to Project/ Method Statement | | |
| **Risk Assessment prepared by** |  | **Name of Person approving RA:** |  | **Date of last review:** |  |
| **Next review due** |  |
| **Limits of use without need for project specific sign off** |  | | | **Circulation List** | All site staff and Project Managers |

**Project specific details & Sign-off by Project Manager (only completed where the standard controls no longer apply)**

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| **Job Number** |  | **Site:** |  | **Project Manager Approving Amended Risk Assessment** |  | **Date:** |  |

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| **Activity** | **Hazard** | **Main Risks**  **&**  **Affected Persons** | **Risk Rating** | | | Existing **Risk Controls** | AdditionalRisk Controls | **Residual Risk** | | |
| **P** | **O** | **RR** | **P** | **O** | **RR** |
| **WELDING**  **WELD FUME** | * Amount of fume produced * The pollutants in the fume produced * the worker exposure to the fume - i.e. time exposed the concentration of fumes that a worker is exposed to * Commonly encountered pollutants in fumes and gases include: * Ozone | **Welding operative**  **Other persons in the area**  **Short term health effects**  Irritation of the throat and lungs  Coughing  Metal fume fever  Temporary reduced lung function e.g. where breathing is easier when not working |  |  |  | * Redesign the job or substitute a substance so that the hazard is removed or eliminated * Remove surface coatings from metals * Isolate people from the hazard by removing welding fume at the source * Change the way people work, * Implement procedures to reduce exposure * Train all workers on the correct use of LEV * Ensure a maintenance and testing program for LEV is in place * All site operatives using tight fitting RPE must be clean shaven | * Use a welding technique that produces less fume * Assess the risk to health from welding fume for other persons, through air monitoring * Protect workers with adequate and suitable PPE * Provide RPE suitable to the task and environment * All tight fitting RPE must be face fit tested to the individual wearer and mask type * Face fit testing should be completed by a Fit2Fit accredited tester * Follow link for a tester in your area   <https://www.fit2fit.org/> |  |  |  |

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| **Activity** | **Hazard** | **Main Risks**  **&**  **Affected Persons** | **Risk Rating** | | | Existing **Risk Controls** | AdditionalRisk Controls | **Residual Risk** | | |
| **P** | **O** | **RR** | **P** | **O** | **RR** |
| **WELDING**  **WELD FUME**  **Continued** | Nickel (potential carcinogen)  Chromium particularly in its hexavalent state (Cr6+)  Cadmium  Lead | **Welding operative**  **Other persons**  **Long term health effects**  Lung cancer kidney cancer  Occupational asthma Pneumonia Bronchitis Emphysema |  |  |  | * Use of a fume extraction tables * Use suitable Local Exhaust Ventilation (LEV) * Inform, instruct and train workers on RPE * Maintain and test RPE at regular intervals as recommended by the mask manufacturer * Ensure records of mask checks and maintenance are recorded in the mask service book | * Ensure that LEV systems have a thorough examination and test (at least every 14 months) Records must be kept for at least 5 years. * Information should be held on the installed LEV system to confirm it provides adequate protection, which should be kept for the life of the equipment. |  |  |  |
| **WELDING EQUIPMENT AND POWER SUPPLY** | Electric supply | **Welding operative**  **Other persons**  Electrocution  Electric shock  Fire |  |  |  | * Prior to the installation of electric arc welding equipment, it is necessary to check that the capacity of the power supply source is adequate to handle the load demand of the welding operation * Proper design, selection, installation and maintenance of plant and equipment, such as ventilation system, electricity supply system and the associated wiring and protective devices;   **Before installation**   * The frame or case of the welding equipment should be properly earthed; * A suitable disconnecting switch or controller should be located near the welding equipment * The welding equipment should be protected by a suitable fuse or circuit breaker on a separate circuit. | * Establishment of safe working system, rules and procedures for manual electric arc welding operation * Provision of appropriate information, instruction and training to the welders and their supervisors on the proper use of the welding equipment and the safety rules and procedures of work * Welding equipment should conform to the appropriate national or international standards * Electrode holders should be properly insulated to avoid any undesirable exposure of live conductor (other than the welding electrode) that can be inadvertently touched by the welding worker. |  |  |  |

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| **Activity** | **Hazard** | **Main Risks**  **&**  **Affected Persons** | **Risk Rating** | | | Existing **Risk Controls** | AdditionalRisk Controls | **Residual Risk** | | |
| **P** | **O** | **RR** | **P** | **O** | **RR** |
| **WELDING EQUIPMENT AND POWER SUPPLY**  **Continued** | Electric supply | **Welding operative**  **Other persons**  **Persons wearing a Pacemaker**  Electrocution  Electric shock  Fire  Malfunction of pacemaker |  |  |  | * Welding cables should be insulated, of robust construction and of sufficient size to carry the welding current safely. * Welding cables connections should be suitably insulated to avoid the exposure of conductive parts. * The requirement as stipulated above may be deviated only in some special situations where the welding return of the welding circuit is connected to or make use of a suitable and effectively bonded common conductor. * To prevent electric shock hazard, all workers in the workplace should be protected from making direct contact with the common bonded structure. * the workpiece should be connected to earth effectively * The earthing conductor should be robust and be adequately protected against mechanical damage. * It should be securely connected to the workpiece by bolted lugs, screw clamps or other effective means. | * The welding return should be firmly connected to the workpiece as close to the point of welding operation as possible to avoid any uncontrollable and undesirable stray current flow that would cause electric shock hazard and fire hazard. * No persons must sit on or lean on the bonded structure and the workpieces * Insulated mat/ stands should be provided and used as appropriate. * Staff using the area must wear insulated clothing and appropriate footwear * To prevent fire hazard due to lose joint/ connection, the bonding, joints and connections of the bonded structure should be regularly maintained to ensure that the bonding is always secure, proper and effective. * Magnetic fields from high currents can affect pacemaker operation. Persons wearing electronic life support   equipment (pacemaker) should consult with their doctor before going near arc welding, gouging, cutting or spot-welding operations. |  |  |  |
| **Activity** | **Hazard** | **Main Risks**  **&**  **Affected Persons** | **Risk Rating** | | | Existing **Risk Controls** | AdditionalRisk Controls | **Residual Risk** | | | |
| **P** | **O** | **RR** | **P** | **O** | **RR** | |
| **WELDING ACTIVITIES** | High temperature of the electric arc used  Sparks or globules of molten metal  Combustible material  Hot welding electrode  Gases  Volatile flammable liquids  Combustible dusts  Combustible  flammable residue  faulty electrical connections or insulation  Lack of correct PPE RPE  Noise  Moving and handling of large metal items | **Welding operative**  **Other persons in the area**  **Eye damage**  **Serious Personal injury**  **Burns**  **Electric shock**  **Slip trip**  **Arc Eye**  Fire and explosion  Ignition of critical mixtures of gases volatile flammable liquids or Combustible dusts with air;  Ignition of the combustible/ flammable residue in the workpiece  Hearing damage  Manual handling injuries |  |  |  | * Welding equipment, cables, and other equipment must be suitably placed to avoid imposing hazards * Suitable warning signs and notices should be displayed by the welding equipment and in the workplace * Firefighting equipment, e.g. portable fire extinguishers, sand buckets, etc., should be provided in the welding workplace and its vicinity * Any water ponding, flooding or dripping/ splashing of water in the welding workplace and its vicinity should be avoided * Suitable eye and face protectors should be provided to and used * Provision of manual handling training for all site staff * A separate manual handling risk assessment must be completed. The risk assessment must comply with the TILE principal | * Welders must be protected from the heat, radiation, sparks and welding spatters by suitable screens and shields * Any combustible/ flammable materials, e.g. grease/ oil, fuel, paint, wooden materials, sawdust being used or stored in the welding workplace or its vicinity should either be removed or be suitably covered by non-combustible or flame-retardant materials * Ensure appropriate personal protective equipment is used such as insulated welding gloves, safety shoes or boots, and insulation mats. * Goggles, welding helmets, handheld shields, or other suitable eye protectors having the proper lens shade for the welding work being done should be worn or used by workers during the welding operations. * Welding equipment conforms to the appropriate international (ISO) or British (BS) standards |  |  |  | |

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| **Activity** | **Hazard** | **Main Risks**  **&**  **Affected Persons** | **Risk Rating** | | | Existing **Risk Controls** | AdditionalRisk Controls | **Residual Risk** | | |
| **P** | **O** | **RR** | **P** | **O** | **RR** |
| **WELDING IN CONFINED SPACES** | Confined space  Lack of oxygen  Lack of emergency procedure  Fumes  Inert gases  Combustible dusts  Chemical reactions (Rusting)  Welding gases such as argon, carbon dioxide, nitrogen and helium can | **Welding operative**  **Others**  Asphyxiation  Serious long-term illness  Lung damage  Fire  Explosion  Reduction of oxygen doe to chemical reaction  Gases displacing the air inside the enclosed space |  |  |  | * Owing to the intrinsically hazardous nature of a confined working environment arc welding operations must be avoided in a confined space as far as reasonably practicable. * Consider if there is a way to do the job without going into the confined space * Ensure that a safety system of work is in place * An emergency rescue plan must be in place for all confined space working * All staff must complete confined space training and confined space emergency rescue training * Where hot work cannot be carried out in a safe area, or where combustible material cannot be removed from the work area, a fire watch should be maintained during and after the hot work. This watch should be maintained for at least 30 minutes after the completion of the hot work, but where an unintended ignition may be difficult to detect or slow to develop, this may need to be extended to 60 minutes. | * Ensure all staff are aware of the emergency rescue plan. * Ensure all staff are given a toolbox talk to ensure they are aware if the amount of inert gas is high enough, they won’t cough, splutter, pant or feel breathless, they will simply pass out. * The process is very fast and self-rescue will not be possible * If the confined space is known to contain hazardous contaminants it is crucial to purge the space adequately before any entry * Never use oxygen supplies to sweeten the air in a working area or confined spaces this is a very serious fire risk * Only competent persons will be permitted to work in confined spaces |  |  |  |

**HSE Web Link to further information**

[**https://www.hse.gov.uk/coshh/essentials/direct-advice/welding.htm**](https://www.hse.gov.uk/coshh/essentials/direct-advice/welding.htm)

[**https://www.hse.gov.uk/welding/index.htm**](https://www.hse.gov.uk/welding/index.htm)

**PPE Required**

**(Please tick all that apply)**

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| **SAFETY HELMET**  **MUST BE WORN** | **HIGH VISIBILITY VEST**  **MUST BE WORN** | **SAFETY BOOTS**  **MUST BE WORN** | **SAFETY GLOVES**  **MUST BE WORN** | **EYE PROTECTION**  **MUST BE WORN** | **EAR PROTECTION**  **MUST BE WORN** | **SAFETY OVERALLS**  **MUST BE WORN** |
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| **LABORATORY COATS**  **MUST BE WORN** | **WELDING MASK**  **MUST BE WORN** | **VISORS**  **MUST BE WORN** | **HAIR NETS**  **MUST BE WORN** | **ESCAPE ROUTES**  **TO BE KEPT CLEAR** | **SAFETY HARNESSES**  **MUST BE WORN** | **NO MOBILE PHONES** |
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|  |  |  |  |  |  |  |
| **REPIRATORS**  **MUST BE WORN** | **HAVE YOU BEEN**  **FACE FIT TESTED?** | **PEDESTRIAN MUST**  **USE THIS ROUTE** | **INTRINSICALLY SAFE OVERALLS**  **TO BE WORN** | **INTRINSICALLY SAFE FOOTWEAR**  **MUST BE WORN** | **OPAQUE SAFETY GLASSES**  **MUST BE WORN** | **DRIVERS MUST REPORT TO SITE OFFICE** |
|  |  |  |  |  |  |  |

**Notes**

* For risk assessments requiring project specific amendment - the Risk Assessment shall be reviewed weekly to ensure, it remains current as the project progresses.
* All employees to attend site induction/sign-in prior to commencing work on site.
* First Aid facilities to be provided by Client/Principal Contractor
* Welfare facilities to be provided by Client/Principal Contractor

**Risk Assessment Matrix**

**Multiply scores to arrive at risk rating (RR)**

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Probability** | | | | | |
|  |  | **Remote** | **Unlikely** | **Possible** | **Probable** | **Very Likely** | **Certain** |
| **Outcome** | **No Injury** | **0** | **1** | **2** | **3** | **4** | **5** |
| **Minor Injury** | **1** | **1** | **2** | **3** | **4** | **5** |
| **First Aid Injury** | **2** | **2** | **4** | **6** | **8** | **10** |
| **Reportable Injury**  **(7 Day)** | **3** | **3** | **6** | **9** | **12** | **15** |
| **Major Injury** | **4** | **4** | **8** | **12** | **16** | **20** |
| **Fatality/Disability** | **5** | **5** | **10** | **15** | **20** | **25** |

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| **Low** | **1 – 6** | **Monitor** | **Tolerable risk. No additional controls required. Employees made aware of safe/correct system of work.** |
| **Med** | **8 – 12** | **Improvement** | **Action required to further reduce risk to acceptable level. Review of process or activity.** |
| **High** | **15+** | **Immediate Action** | **Unacceptable risk. Stop activity immediately. Inform next level of management & refer to Manager/Safety Coordinator. Possible withdrawal of process or activity.** |

**Monitoring and Review**

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| **Date Completed** | **Assessed by:** | **Job Title:** | **Signature:** | **Review Date:** |
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**Further Actions**

**(Please detail any actions for the risk assessment here)**

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| **Issue** | **Further action** | **Action by who?** | **Action by when?** | **Completed** |
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**All actions to be followed up are marked in bold in the body of the risk assessment above.**

**Confirmation of Risk Assessment & Method Statement Briefing**

**Before commencing the activities covered in this safe system of work document all staff are to sign below to confirm that a clear briefing explaining the job has been given and is understood**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Signature** | **Date** | **Comments** |
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