Welding and Brazing Operations

Appropriate protective clothing, in the form of heat-resisting gloves (non-asbestos), fire-resistant overalls (not nylon) or aprons, fire-resistant footwear and welders spats all to approved designs, must be provided where necessary, and used at all times. Protective goggles or face shields, specially designed for welding work, are absolutely essential, for both the welder and any person assisting. Failure to wear suitable eye protection will result in an extremely painful condition of the eyes which may result in partial or total blindness.

All types of welding and brazing produce some degree of toxic fume and it is necessary to ensure adequate ventilation of each working area. Many silver solders contain cadmium, which produces extremely toxic fumes. Efficient local exhaust ventilation here is essential, and the operator should take every precaution to avoid breathing these fumes.

Fire-resistant screens should enclose welding operations, in order to prevent these being accidentally viewed by other personnel, and, at places where welding operations are carried out frequently, the nearby walls should be painted matt black to prevent reflections.

Consideration must be given to specific fire precautions during welding or brazing operations. Such operations should never be undertaken close to areas containing flammable liquids, vapours or dusts. Before commencing any welding operations, make sure that an appropriate fire extinguisher is readily accessible. A model "hot work" Permit to Work system is available from the University Works Division, or from Health and Safety Department, Charles Stewart House, 9-16 Chambers Street.

A strict Permit to Work system must be operated for welding or cutting tanks, barrels or other containers which may have at one time held flammable materials. This Permit must contain details of safety procedures, including thorough cleaning, purging and venting of the container, prior to "hot work" commencing.

Welding should never be carried out inside confined spaces without a strict Permit to Work system, specifying ventilation requirements and standards of respiratory protective equipment to be employed, as well as appropriate physical precautions.

Oxy-Acetylene Welding

Acetylene and oxygen cylinders must be installed and used vertically, chained to a wall rack or secured in a welding trolley. Flash back arrestors must be fitted on both the acetylene and oxygen supplies, to prevent explosions from blow backs. Cylinders, regulators, hoses, nozzles and guns, should be regularly inspected and leak tested using soap/water solution. Users of gas welding

equipment should be acquainted with the particular hazards associated with both acetylene and oxygen cylinders, particularly the necessity of keeping all oxygen equipment free from oil and grease. Valve keys must be kept in position on each cylinder at all times to facilitate immediate shut off in the event of a malfunction.

Electric Arc Welding

In addition to the general precautions applicable to all welding processes, all insulation and earthing arrangements must be maintained to a high standard, regularly checked, and defective equipment taken out of service until repaired. Arc welding must not be carried out in damp or wet surroundings, and the operator's hands and clothing must be kept dry. Earth leads must never be connected to electrical conduits or to pipes containing flammable liquids or gases.

Care must be taken to prevent the uninsulated part of the electrode holder from coming into contact with the earthed workpiece or the earthing clamp, whilst the current is switched on, as the resultant flash is extremely hazardous to the eyes. The arc must never be struck without an appropriate face shield in place, and such eye protection must be kept in the protective position until the arc extinguishes, as even momentary flashes are very hazardous to the eyes.

Electric arc welding equipment should be subject to inspection and test, as required by the Electricity at Work Regulations (See guidance page on Electrical hazards).

Mild Steel welding

The HSE have recently (early 2019) released an update on mild steel welding fume as the International Agency for Research on Cancer have found that exposure to mild steel welding fume can cause lung cancer and possibly kidney cancer in humans. The Workplace Health Expert Committee has endorsed the reclassification of mild steel welding fume as a human carcinogen. The HSE have announced that they have strengthened the enforcement expectations for all steel welding fumes, not just limited to mild steel. Further details at http://www.hse.gov.uk/safetybulletins/mild-steel-welding-fume.htm

Actions required locally:

Risk assessments:

In the first instance, all tasks involving steel welding must be reviewed with risk assessments updated as required. The risk assessment must take into consideration the controls measures, such as LEV/RPE and if health surveillance is required, based on residual risk and other factors such as frequency of possible exposure.

LEV and RPE:

Indoor welding must have suitable LEV in place. If this is not possible, or does not give adequate protection, then suitable RPE must be provided. All operatives undertaking outdoor welding must be provided with suitable RPE. All RPE which is required for protection must be facefit tested, see https://www.ed.ac.uk/health-safety/guidance/ppe/facefit for how to arrange a test, with https://www.ed.ac.uk/health-safety/guidance/ppe/rpe for guidance on RPE.

If there is a continued concern regarding exposure, then please contact the Occupational Hygiene Unit who can assist with organising measurements of welding fume, occupational.hygiene@ed.ac.uk.

Health surveillance:

Health surveillance should be considered for those at risk of frequent or continuous occupational exposure to metal fume, taking into account the exposure control measures in place. Vaccination may reduce the risk of invasive pneumococcal disease but should not replace the need for measures to prevent or reduce exposure. If your risk assessment deems that health surveillance is required, please email occupational.health@ed.ac.uk with the names and staff numbers of those requiring health surveillance.

Further information and guidance

The HSE have produced specific guidance on welding, available at http://www.hse.gov.uk/welding/guidance/index.htm?utm_source=govdelivery&utm_medium=email&utm_campaign=Welding&utm_term=riskmanagement&utm_content=coshhsheets-nov19#