



Electrobraze®

Committed to Cadmium-Free Pin Brazing

Today Pin Brazing is a widely used and versatile Electrical Bonding process, from Railroad to Offshore and Earthing to Utilities. Cadmium-free silver brazing filler metals were developed back in the 1940's and all early silver Brazing Pins contained filler metals which were Cadmium-free, but in recent years these had become less widely used by other Pin Brazing Manufacturers in favour of Brazing Pins containing Cadmium Bearing Alloys and mainly distributed throughout the Pipeline Industry due to their lower working temperatures and compatibility with Pipeline materials.

Due to changing legislations and increasing Health and Safety awareness Electrobraze Limited have been committed to developing a complete range of Cadmium Free Brazing Pins and Consumables. To date we are the only Pin Brazing Manufacturer to be completely Cadmium Free, having never marketed, developed or distributed any Cadmium Bearing Pin Brazing Products. As a result we have developed a much safer and more versatile range of Pin Brazing Consumables than has ever previously been available.

Health & Safety

The first important reason for use of Cadmium-free Pin Brazing filler metals is that of health and safety. Most employers put health and safety in the workplace at the heart of their businesses. Consequently an employer's duty of care towards its employees in relation to cadmium should be addressed. A principle of the EU Chemical Agents Directive, and related national regulations such as UK COSHH, is the substitution of hazardous materials where safer alternatives exist. That is to say that Pin Brazing with cadmium alloys is known to be potentially hazardous, therefore, the safer cadmium-free alternatives should be used. The potential risks of using cadmium containing brazing filler metals have been known for several decades and consequently many companies now insist upon cadmium free Pin Brazing.

What is Cadmium and why is it a Problem in Pin Brazing?

Cadmium is a metallic element that melts at 321°C. If it is heated in air above this temperature cadmium oxide will be formed. Typically the cadmium-containing filler metals contain between 16 and 25 percent of cadmium by weight. Pin Brazing with a cadmium containing filler metal normally takes place at or above 610°C. Consequently some cadmium oxide fume will always be liberated during brazing. However, cadmium boils at 767°C and above this temperature much greater quantities of harmful fume are evolved, overheating of the alloy whilst Pin Brazing is virtually unavoidable as the Arc temperature is above 2000°C and this can result in the workplace exposure limit for cadmium being exceeded.

Considerations for Distributors

Distributors and resellers of Pin Brazing materials have a clear duty of care to their customers. Products should not be sold in unlabelled packaging without health and safety warnings and documentation. This means that the practice of splitting packs to sell individual Brazing Pins is not recommended and could lead to the distributor failing in his or her duty of care to the customer. For cadmium-containing products this is especially important. Being able to advise about the problems associated with using cadmium-containing brazing filler metals is also important as part of a duty of care towards customers for these products. Cadmium-containing brazing Pins should never be sold to inexperienced operators or where fume extraction is not in place. The safer cadmium-free products should always be offered as an alternative to cadmium-containing Brazing Pins.

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What Health Risk does Cadmium Present?

What are the potential health implications of exposure to cadmium oxide fume? Serious health effects on the kidneys and lungs are significant concerns from inhalation exposure. Cadmium oxide may affect fertility and damage unborn babies. Young people are at particular risk. Cadmium oxide has been classified as a Category 2 carcinogen. In other words it may cause cancer in humans. The UK Health and Safety Executive publication 'Cadmium in Silver Soldering or Brazing - Engineering Sheet No.31' explains the health effects in more detail and this can be obtained from the HSE at this address www.hse.gov.uk/pubns/eis31.pdf.

What Should Companies Using Cadmium-containing Pin Brazing Products be Doing?

Under COSHH, employers and the self employed must prevent exposure to cadmium or its compounds. This means changing to cadmium-free Brazing Pins. Where this cannot reasonably be done a proper assessment of the health risks arising from Pin Brazing with cadmium-containing Brazing Pins should be completed. The precautions necessary to prevent or adequately control these risks should also be assessed. Assessment may require air sampling and biological monitoring.

Companies using cadmium-containing Brazing Pins should do the following:-

- Train and inform workers on hazards and related precautions
- Totally enclose the process and handling systems as far as is reasonably practicable
- Have local and general fume extraction
- Use equipment and processes which minimise, suppress and contain fume and dust
- Restrict the number of people exposed and the periods of exposure
- Prohibit smoking, eating and drinking in contaminated areas
- Regularly clean work surfaces by vacuuming up dust in order to minimise contamination
- Provide suitable washing and changing facilities close at hand
- Demarcate potentially contaminated areas and display suitable warning signs
- Ensure safe storage, handling and disposal of cadmium-containing brazing filler metals
- Use closed and clearly labelled containers

Warning! Cadmium oxide is classified as a carcinogenic chemical

The Environmental Reasons for Going Cadmium-Free

The second reason for going cadmium-free is the recent changes in environmental legislation.

There has never been a time when we have been more aware of our impact on the environment. Phrases like 'Global Warming', 'Climate Change' and 'Carbon Footprint' are now part of our everyday vocabulary. Recycling of products, packaging and general waste affects us at home and in the workplace. More and more we feel a responsibility to live 'greener' and more environmentally considerate lives.

New Legislation

New European environmental legislation is giving rise to a sea change in the materials that can be used by manufacturers. Distributors of materials must also be aware of these pressures so that they can advise customers on how to work within the legislation. The use of cadmium in products is increasingly recognised as being undesirable both in terms of the long-term environmental impact and recyclability of products. European Union directives prevent the use of certain hazardous substances including cadmium-containing materials. They are the End of Life Vehicles or ELV Directive, the Restrictions of Hazardous Substances or RoHS Directive and the WEEE Directive on waste electrical and electronic equipment. These EU directives effectively ban the use of certain heavy metals, including cadmium, from a broad range of components and

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products. Examples of items affected are vehicles, household appliances, IT and telecoms equipment, consumer equipment, lighting equipment, electrical and electronic tools, toys and leisure and sports equipment. In addition there are other applications where cadmium is not permitted. For example it is not used in medical components or environments associated with food and drink. Many of us have heard about mercury being banned from thermometers. Cadmium is affected by similar trends in legislation, and a wider reaching ban is possible.

The Implications of Going Cadmium-Free

Electrobraze Silver-flow™ Cadmium Free Pin Brazing and Electrode Brazing Products

- SF620
- SF650
- SF670

Higher Brazing Temperatures

Cadmium-free products tend to have higher and longer melting ranges, which results in a marginal increase in process times and brazing temperatures.

- Silver-flow™ SF620 618°C - 652°C
- Silver-flow™ SF650 630°C - 660°C
- Silver-flow™ SF670 675°C - 735°C

Changing Standards and Specifications

Changing to cadmium-free filler metals will also mean a change in the brazing standard that the filler metal conforms to. The user may have to amend their records to show the correct standard of the new brazing filler metal. Subsequent customer approvals or pre qualifications may need to be sought.

Electrobraze Limited is committed to promoting safe cadmium-free Pin Brazing. The majority of our customers have already made the change to cadmium-free Pin Brazing. If you would like to find out more on this subject email Electrobraze at enquiries@electrobraze.com or visit our website at www.electrobraze.com for more information, or contact us on + 44(0)1952 247 405. Alternatively see The Health and Safety Executive publication 'Cadmium in Silver Soldering or Brazing - Engineering Sheet No.31'

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