

How can working with ferrous molten metals affect my health?

Working in foundries or with molten metal can expose workers to several health risks including:

Cataracts

Some foundry workers face an elevated risk of cataracts due to chronic exposure to **infrared (IR) radiation** emitted by high-temperature furnaces and molten metal. It can cause specific types of eye damage known as "glassblower's cataract" or heat cataract.

Respiratory Illness

Dust from sand, fettling and furnace linings contains silica and, when dry, produces particles known as respirable crystalline silica (RCS). Inhaling RCS can cause silicosis which is a serious and irreversible lung disease that causes permanent disablement and early death.

Molten metal fume (foundry fume) can be hazardous to health. Ferrous foundry fume can cause lung cancer. Other foundry fume and spray mists can cause lung diseases including asthma.

Phenol formaldehyde and **urea formaldehyde** resins are used extensively in the hot box and warm box processes to produce cores and moulds. The resins are mixed with a catalyst and sand which, when heated, hardens to form a mould or core.

During this process, formaldehyde is given off which is a potential respiratory sensitiser and has been shown in experiments to cause cancer in animals. It is not however, a proven human carcinogen. Formaldehyde can irritate the eyes, skin and respiratory tract and prolonged exposure could cause skin sensitisation and allergic contact dermatitis.

Furanes are used in some cold-set processes in combination with furfuryl alcohol and mineral acids to create bonding resins.

Vapours arising during foundry processes are irritant to the eyes, skin and respiratory tract and are potential respiratory sensitisers. Absorption through the skin can lead to a toxic effect on the central nervous system.

Dermatitis and skin Issues

Prolonged contact with chemicals and binding agents may cause skin sensitisation and allergic contact dermatitis, as can exposure to solvents and metalworking fluids.

Dust may dry out skin and cause cracking.

Exposure to high temperatures can cause **Heat Rash (Miliaria)**: Sweat gets trapped under your skin in hot foundry environments and causes tiny, itchy bumps.

Radiant heat may cause **Toasted Skin Syndrome** (Erythema ab igne), a harmless but unsightly skin condition. The heat is not hot enough to cause an acute burn but damages the skin and blood vessels over time.

Hand Arm Vibration Syndrome (HAVS)

There are many processes within foundries where exposure to hand arm vibration may occur. Employees may be at risk of suffering **HAVS or Vibration induced Carpal Tunnel Syndrome (V-CTS)**.

These conditions can cause painful and disabling disorders of the blood vessels, nerves and joints.

Noise Induced Hearing Loss

Foundries are loud workplaces. Sound levels may reach up to 117 decibels (dB) in some areas such as Knockouts and the Fettling Shops. This is as loud as a rock concert or a siren. Due to the nature of the work, it is inherently difficult to control. Without hearing protection (PPE), this noise may cause permanent **hearing loss** and/or **tinnitus**.

Musculoskeletal Injury

Manual handling is one of the most common causes of injury at work.

Musculoskeletal Disorders (MSDs), such as upper and lower limb pain/disorders, joint problems and **repetitive strain injuries (RSI)** accounted for almost a quarter of all injuries reported by molten metal industries.

Exposure to Electromagnetic fields (EMF)

The strong electromagnetic fields generated by equipment such as **Induction Furnaces** may interfere with the operation of wearable or embedded medical equipment such as hearing aids and pacemakers. In some people, it can stimulate nerves causing temporary effects such as dizziness or visual disturbances. It can also cause local tissue heating.

Workplace Exposure Limits

Many of the agents identified in this document, including dust, fume, noise and vibration have specified maximum exposure limits set by the **Health and Safety Executive (HSE)** to protect workers' health. Your employer should monitor and control your exposure and, where other controls are insufficient, provide suitable PPE, which employees must use and care for.

Health Surveillance

Where there is a residual risk of exposure after controls have been implemented, then your employer should consider undertaking Health Surveillance, such as skin, respiratory, hearing and HAVS assessments. These checks are designed to ensure that controls are effective and identify health effects at an early stage, so that prompt intervention may take place.

A copy of this & other documentation can be found from <https://mohs.co.uk/resources> or using the QR code below.



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Working With Molten Ferrous Metal – Key Health Facts



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