



Metal Products and Machinery

High Risk Sector



Processing raw metal into products such as machines, tools, structural elements etc. for use in use in household, construction and industry. For manufacture of basic metals refer to the related sector 'Iron, Steel and other Metals'.

Related Sectors:

- Iron, Steel and other Metals
- Electronic Products
- Precision Instruments



Production Processes

Production of metal goods and machinery involves the (mechanical) shaping of metal parts and the (chemical) treatment of metal surfaces. Processes may be largely manual, with each item dealt with individually, or highly automated.

When working metal **mechanically**, heat and/or physical forces are applied. To obtain items of the desired size and shape, metals may be forged, rolled, cast, formed, turned, drilled, punched, etc. Lubricant or water is applied to cool the worked pieces. The products may then be screwed, welded, riveted or assembled in other ways.

In a further step, the **surface** of metal parts may be treated or coated. The main purposes are abrasion, hardening, corrosion protection and coloring. The technologies employed range from abrasive blasting to acid washes and multi-stage chemical processes. Often, metal is coated for protective and/or decorative purposes. Among the various painting methods, spray painting and electrodeposition are most common.

Among the largest purchasers of fabricated metal products are the automotive industry, mechanical engineering, shipbuilding, aerospace and air transportation.

Sustainability Issues

	Energy
	Water Use
	Emissions to Water
	Waste
	Emissions to Air
	Ecosystems
	Workplace Health & Safety
	Disaster Risk
	Site Contamination

Sector Rating

- High risk issue
- Medium risk issue
- Low risk issue

Risks & Opportunities

- **Waste water and liquid waste may contain toxic substances which present a risk to water quality.**
Potential water pollutants are: Plating solutions from electroplating (containing heavy metals, cyanides, fluorides, etc.), chlorinated solvents used for degreasing, oil and grease, cutting and drilling liquids.
- **While most waste will be recyclable metals, some waste may be hazardous.**
Potential sources of hazardous waste produced in metals and machinery manufacturing: Sandblasting (grit), wastewater treatment and electroplating (sludges), cleaning and ventilation (dust). Recycling options and appropriate disposal of hazardous waste improve efficiency and minimize environmental impacts.
- **Emissions to air come mainly in the form of metal dust and solvents from varnishes and paints.**
Volatile solvents from paints and surface treatment may present a temporary nuisance and a health risk for residents in the surroundings. Metal dusts can result in long-term contamination and poisoning. Appropriate ventilation and filters can effectively minimize emissions to air.
- **The contamination of property presents a risk to its value, to human health and to the environment.**
Spills of liquids in production, leaks in tanks or pipes and disposal of liquid waste may contaminate buildings and the ground. This may present a risk to groundwater resources or to human health. Clean-up costs may be considerable. The market value of contaminated property may be impaired. Contaminations can be avoided by training of staff and technical measures.
- **The main risks to workers' health are: Noise, exposure to heavy machinery, metal dust heat and vapours from metal working fluids.**
Training, adequate process and workflow design as well as state-of-the-art protective equipment keep these risks to the health and lives of workers to a minimum level.