International Hazard Datasheets on Occupation

Galvanizer

Who is a galvanizer?

A galvanizer is a worker who uses equipment to coat iron and steel products with corrosion-resistant molten nonferrous metal. He cleans, coats and tests the coating quality of galvanizing items.

What is dangerous about this job?

- Falls on slippery floors, due to extensive use of water and various chemical solutions.
- Acute poisoning or chemical burns caused by the extensive use of concentrated acids and alkalis.
- Exposure to corrosive substances: sulfuric acid, hydrochloric acid, zinc chloride, etc.
- Exposure to free crystalline silica during sandblasting. Crystalline silica (quartz) is classified as a known human carcinogen.
- Musculoskeletal injuries caused by overexertion while lifting and moving heavy objects intended for galvanization.

Hazards related to this job

Specific preventive measures can be seen by clicking on the respective in the third column of the table.

Accident hazards	• Falls on slippery floors due to extensive use of water and various chemical solutions	1
	• Being hurt by falling objects intended for plating, while handling them, or from overhead installations/conveyers situated over the plating baths	
	• Injuries, especially to the eyes, caused by flying particles, while cleaning (sandblasting) metal objects before plating	2
	• Cuts and punctures by sharp parts of metallic objects intended for coating	2
	• Electric shock caused by contact with defective equipment, or with defective electrical installations	3
	• Burns and scalds caused by contact with hot surfaces such as drying furnaces, bathes with molten metal or by splashed molten metal	2
	• "Freeze burns" or frostbite, from rapid evaporation of hydrochloric acid (the substance is corrosive to the eyes, skin and the respiratory tract)	4

	• Acute poisoning or chemical burns from extensive use of concentrated acids and alkalis	4
	Exposure to corrosive substances: • **Sulfuric acid** (the substance is very corrosive to the eyes, skin and the respiratory tract): short periods exposure to high vapour concentration of concentrated acid may cause pulmonary oedema Injury of eyes and other parts of the body caused by splashes of the liquid that is used for the evaporation, from defective pipes. • **Zinc chloride:** corrosive to eyes and skin; the aerosol is irritating to the respiratory tract; acute exposure to high concentrations of the substance can lead to Adult Respiratory Distress Syndrome leading to pulmonary fibrosis and death	2 4
	• Musculoskeletal injuries (esp. of the back), resulting from lifting and moving of heavy metallic objects.	5
Physical hazards	• Exposure to excessive noise levels during the preparation of the metal surface for galvanization (sandblasting or abrasive cleaning with another material)	2
	• Exposure to adverse working environment (high temperature and humidity, vapors of corrosive substances).	4
Chemical hazards	• Exposure to free-crystalline-silica during sandblasting. Crystalline silica (quartz) is classified as a known human carcinogen	2 4
	• Exposure to alkaline vapours while using caustic substances for cleaning. A hot alkaline solution is used to clean the metal surface of objects intended for galvanization	6 8
	• Exposure to sulfuric acid throughout the process of cleaning steel surfaces from scale or/and rust before galvanization. Repeated or prolonged exposure to sulfuric acid may result in lung and tooth damage. Vapors of concentrated sulfuric acid are known as human carcinogens	6 8
	• Exposure to hydrochloric acid during surface preparation of the metal prior to galvanizing: Repeated or prolonged exposure to vapours of hydrochloric acid may have effects on lungs - resulting in chronic bronchitis, and on teeth - resulting in erosion	6 8
	• Exposure to vapours of molten zinc in the galvanizing process. Repeated or prolonged contact of zinc oxide with skin may cause dermatitis. Repeated or prolonged inhalation may cause asthma	2 4 6 7
	• Short-term exposure to high concentrations of zinc oxide irritates the respiratory tract. Inhalation of dust or fume may cause metal fume fever (the symptoms become manifest within a few hours of exposure)	
	• Exposure to high concentrations of zinc chloride fume can lead to Adult Respiratory Distress Syndrome leading to pulmonary fibrosis and death. The substance is corrosive to the eyes and skin. The aerosol is	6

	irritating to the respiratory tract.	
Biological hazards	• No biological hazards specific to galvanizers have been identified.	
Ergonomic, psychosocial and organizational factors	• Musculoskeletal injuries caused by overexertion while lifting and moving heavy objects intended for galvanization	5
	• Musculoskeletal injuries related to awkward and harmful working postures while hanging heavy objects over cleaning and galvanic baths.	5

Preventive measures

1. Wear safety shoes with non-skid soles.
2. Wear suitable protective clothing according to the specific type of work [cleaning by sandblasting or by (alkaline/acidic) solutions]: appropriate headgear, goggles, earmuffs, gloves, boots, etc.
3. Call a qualified electrician to examine and repair faulty or suspect electric equipment.
4. Install effective exhaust ventilation to prevent air pollution and creation of harmful environment conditions (alkaline/acidic vapours, humidity); if necessary, wear personal respiratory protection.
5. Learn and use safe lifting and moving techniques for heavy or awkward loads; use mechanical aids for the lifting of heavy loads.
6. Wear a respirator to avoid inhalation of dust or aerosols.
7. Protect hands with chemical-resistant gloves; if impractical, use a barrier cream to avoid exposure of skin to corrosive chemicals and/or solvents; it is recommended to use special soaps for cleaning hands after work.
8. Maintain a high level of personal hygiene; shower and change clothes at the end of work; do not take work-soiled clothing home.

Specialized information

Synonyms Coating Worker; galvanizer; metal Plater; Tin/Zinc Dipper.

Definitions and/or description Tends equipment to coat iron and steel products with corrosion-resistant molten nonferrous metal: Suspends metal objects, such as pails, shelving, nuts and bolts, and structural steel from conveyor hooks or places them in wire baskets. Immerses objects in chemical solution to clean surface of scale and foreign matter. Lowers objects into tank of ammonium chloride or other flux to protect surface from oxidation and facilitate coating. Dips objects into tank of molten metal to coat objects, using hoist or conveyor. Removes objects from tanks after specified time. Places objects,

such as nuts and bolts, in centrifuge and starts machine to cool objects and remove excessive coating. Places objects, such as shelving and structural steel, into water tank or transfers them to storage area to cool. Smooths coating, using wire brush and file. Inspects objects for even and complete coating and returns defective objects for reprocessing. Scoops dross from tank, using long-handled scoop, pours dross into molds, and weighs molded dross. Turns valves to regulate temperature in dipping tank. Adds coating metal and chemicals to maintain specified levels and mixtures in cleaning, dipping, and fluxing tanks. May be designated according to type of coating applied as Galvanizer, Zinc (galvanizing); Tin Dipper (galvanizing) [DOT].

Related and specific occupations

Chromium plater; degreaser; electroplating worker; enameller; metal finisher; nickel plater.

Tasks

Adding; adjusting; analyzing; arranging; assembling; balancing; blending; bringing in; cleaning; connecting; controlling; cooling; dipping; determining; diluting; dissolving; drying; evaporating; examining; filling; filtering; hanging; heating; immersing; installing; lowering; marking; measuring; mixing; moving; observing; operating; performing; polishing; plating; pouring; precipitating; preparing; promising; reading; regulating; removing; rinsing; sampling; separating; sorting; supposing; taking out; treating; washing; weighing.

Primary equipment used

Centrifuge; container; conveyor; hanging hooks; files; levers; metal brushes; metal net baskets; plating bath; tanks.

Workplaces where the occupation is common

Electronic industry; galvanizing section in a metal factory; pipe manufacturing; workshop and factory for metal galvanizing.

Notes

1. The symptoms of lung edema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.

2. Zinc chloride is very toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.

References

1. ILO Encyclopaedia of Occupational Health and Safety, 3rd Ed., Geneva, 1983.

2. ILO Encyclopaedia of Occupational Health and Safety, 4th Ed., Geneva, 1998.

3. Kirk-Othmer, Encyclopedia of Chemical Technology, 4th Ed., 1992.

4. U.S. Department of Labor: Dictionary of Occupational Titles – DOT, 2 Vol., 1991.

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