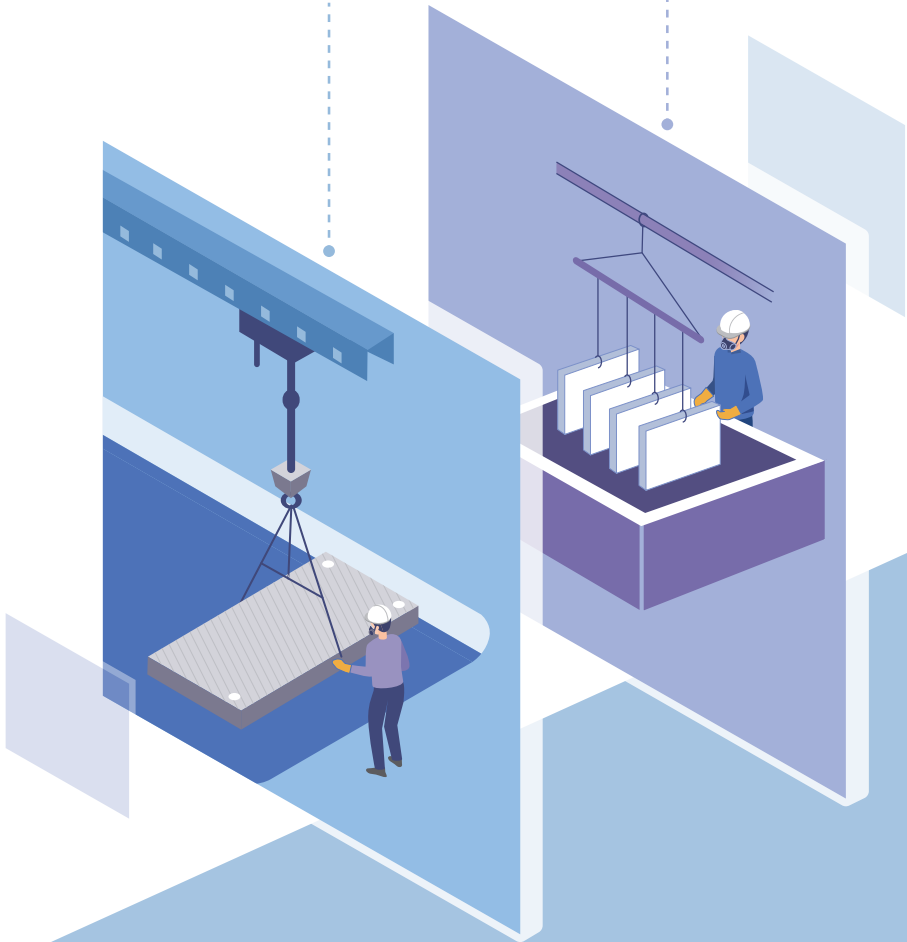
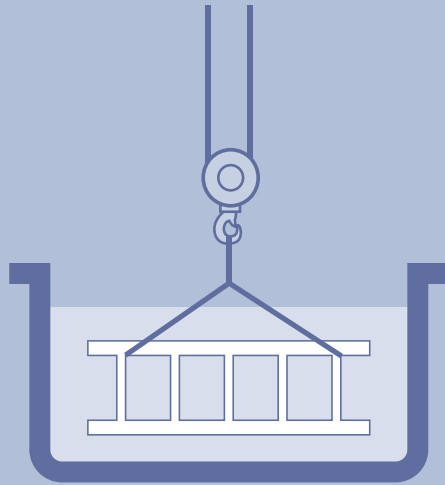


Safety and Health for Molten Plating Business



Safety and Health for Molten Plating Business

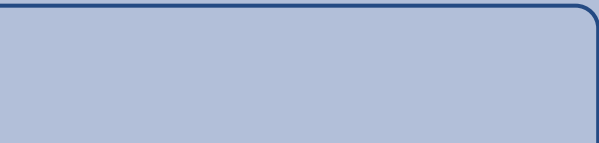


Information on Molten plating business

01 Overview of Molten plating business	04
02 Characteristic of Molten plating business	06
03 Information on Industrial Accidents	09

Safety&Health information by processes/duties

01 Overview by processes/duties	11
02 Major risk&Hazard factors	13



Information on Molten plating business

01

Overview of Molten plating business

02

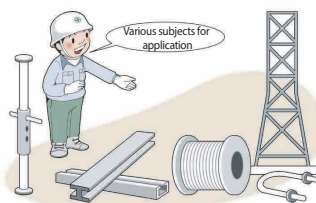
Characteristic of Molten plating business

03

Information on Industrial Accidents



Overview of Molten plating business

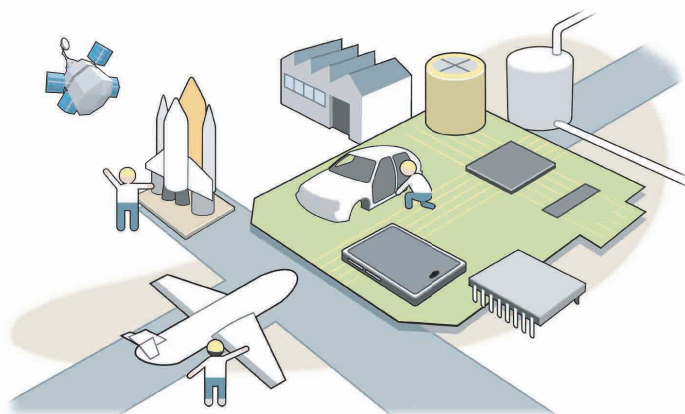


Surface finishing technology

Most metals are consumed in a few hours through corrosion as new compounds are formed on the surface due to moisture, oxygen and reactive gas once they are exposed to the air and natural environment. Hence, technology preventing corrosion is absolutely required. It is called 'surface finishing,' a technology processing the surface designed to improve wear-resistance, heat-resistance and corrosion-resistance of the metal itself and to enhance the color and gloss of the metal surface.

Surface finishing technology is a technology elevating the added value of products by improving the durability and functionality of materials and components as well as the beauty by means of physical, chemical or electrochemical processing of surface properties of the materials. This technology is being utilized in order to grant the surface characteristics different from the general characteristics of the materials.

The types of surface finishing of metals include plating, anodizing, conversion treatment, painting, lining, coating and surface hardening, as shown in the following table. From the above, the plating is mostly used for the final finishing process from the manufacturing processes of products.





Types of metal surface finishing

Table 1-1

Name	Finishing methods
Plating	Finishing with creating films by using other metals on the surfaces of metal or nonmetal
Anodizing	Forming oxide films through electrolysis of metals, i.e. aluminum, to anodes
Chemical Conversion treatment	Forming oxide films or thin films of inorganic salt through chemical reaction at the surface of metal materials
Painting	A method to improve corrosion-resistance or decorative features by applying the paints to the metal
Lining	A method to improve acid-resistance by coating the metal with rubber or synthetic resins
Coating	A method of physical coating of synthetic resins, enamel and ceramics on the surface of metals
Surface hardening	Forming of large films with strong wear-resistance by permeating carbon, nitrogen and boron to the surface of metals

The technology readjusting and processing the surface of materials suitable to the purpose and use is not just being used for metal materials only.

However, metals have the surface with superb mechanical properties together with a glossy and smooth surface compared to other materials, therefore, it is very important in industrial terms to maintain the favorable surface attributes of metals.

Classification of plating metals

Plating is coating with thin layers of other materials for the purpose of improving the surface conditions of objects. In general, it means to coat thin layers of metal or alloy, and they are classified as shown in the following table depending on the finishing methods.

Type	Finishing methods	Useage
Electro-plating	A method producing different metal films on the metal or nonmetal materials by means of electric energy	Wide variety of uses, i.e. decoration items and industrial supplies
Chemical plating [Electroless plating]	A method producing different metal films on the metal or nonmetal materials by means of chemical changes	Plastic products, metal products
Molten plating	A method creating molten metal films by inserting an object in the melt of the metal to plate	Zinc, tin plated steel plates, zinc-plating pipe, etc.

Characteristics of Molten Plating Business



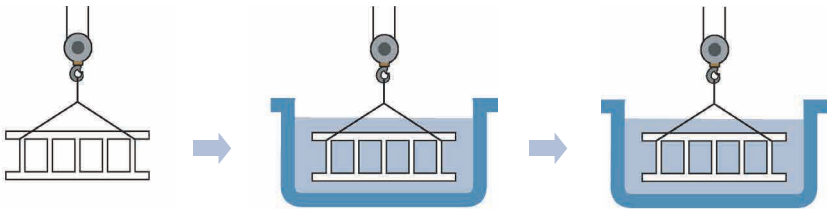
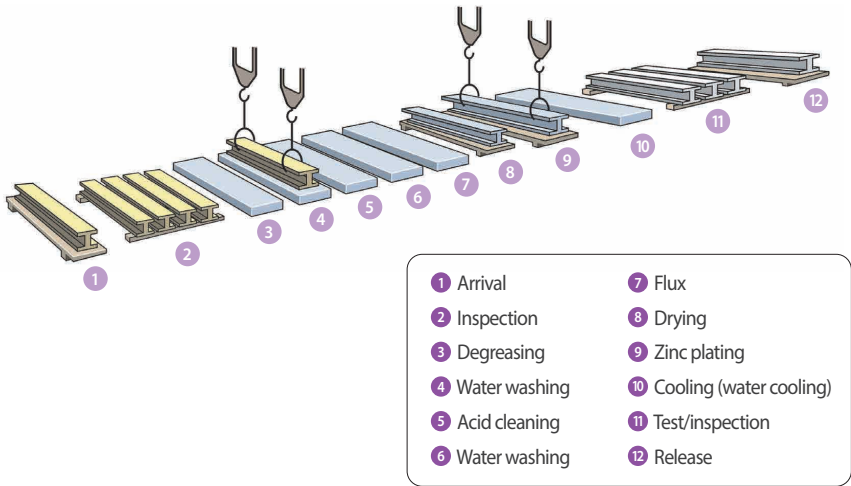
Characteristics of Molten Plating Business

Plating business is innate with the characteristics where various types of products are produced in a small quantity based on order-based productions in addition to pollution, technical diversity and expertise. At the same time, it requires less investment costs than other industries where factories are operated on a small scale. But because of the above, numerous businesses are competing against each other to incur excessive competitions during bidding processes, which leads to stagnant technical advancements as the businesses are more focusing on price competitions rather than technical developments. However, the plating business is widely applied to major and critical components from general decorative accessories, Korea's core export products, such as automobile, semiconductor and electronic/communication parts, and aerospace industry of the future. Most workplaces of molten plating businesses use zinc-plating methods. Some business sites use aluminum and zinc plating. For general cases of molten plating, there are zinc plating aiming to prevent corrosion of metal materials of long-term outdoor or underground uses, such as zinc steel plate (zinc plated plate), guide rail, steel pipe and steel wire, and aluminum plating applied to the components requiring heat-resistance, weatherproof and corrosion-resistance, i.e. automotive mufflers.

A molten plating business is required to use a massive volume of harmful substances, such as acid, heavy metal and cyanide, at the workplace, and because its working environment is poor, it is the type of business with high risks of health problems. Due to such nature, the businesses employ a filtering air purification system to remove particle materials, such as zinc fume, generated from the plating bath in addition to absorption tower-type air purification systems to eliminate gaseous contaminants, including hydrogen chloride, sulfur oxides and zinc mist, used by pickling tanks and flux tanks during the process of molten plating.

Brief process of molten zinc plating

Picture 1-3



1 Preparation

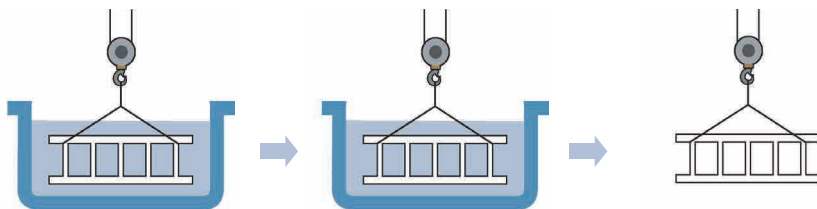
Classification and arrangement by products preparations to ensure the safe insertion into the plating tank according to the types of products

2 Degreasing treatment

In general, the surface of the object to be plated suffers rusts, and oils and fats remain on the surface. These fats and oils need to be removed prior to the acid-cleaning process.

3 Acid cleaning

During molten zinc plating, zinc is attached to the surface of steel not by physically but by alloying of iron and zinc. Hence, there should be no substance on the surface interrupting mutual contacts during alloying reactions. Rusts and other foreign substances need to be removed by hydrochloride or sulfuric acid, so that pre-treatments can be completed in order for outstanding plating films to be formed.



4 Water washing

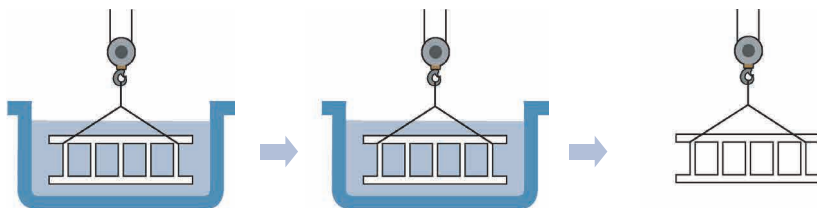
The products treated with acid need to be cleanly washed for the next process.

5 Flux treatment

Foreign substances are removed from the steel surface, zinc oxide is removed from the surface of the objects to be plated, and the surface of the product is prevented from oxidation. It takes about 5 minutes at 80°C

6 Drying

Before the product goes into the plating bath, moisture is removed from the surface of the product. The product will be dried in order to maintain optimal condition prior to plating.



7 Zinc plating

It is to form zinc-plating films with superb adhesiveness, corrosion-resistance and shock-resistance from alloying reactions. Plating process will be performed at 430°C to 450°C.

8 Cooling treatment

The product is cooled and cleaned for a specified period of time in order to maintain stable plating conditions.

9 Quality inspection

Oxidants are removed from the surface, and inspections are performed to check standardized products.



10 Packaging/shipping

The products of which quality inspection is completed are packaged and shipped out.

03

Information on Industrial Accidents



Information on Industrial Accidents

10 Types of Industrial Accidents in Molten Plating Business

- 01 Part of human body is trapped in the power transmission section during maintenance works of plating line
- 02 Trapping between rollers within the automatic plating line
- 03 Trapping of fingers between steel plates during crane (hoist) works
- 04 Falling down on slippery floor surfaces during zinc plating works
- 05 Collision with a forklift during loading/unloading works of products
- 06 Falling from the acid-cleaning tank during sample collection works
- 07 Hit by the object for plating at the fiber rope fractures for tail-piece works
- 08 Burn by emissions due to rapid exothermic reaction
- 09 Suffocation during cleaning works at the wastewater treatment facility
- 10 Electric shocks by the rectifier at the wastewater treatment facility

It is difficult to describe all the details of the business through this executive guideline on practical duties; hence, the details regarding molten zinc plating business from various molten plating businesses previously mentioned will be mainly discussed.





Safety & Health information by processes/duties

01

Overview by processes/duties

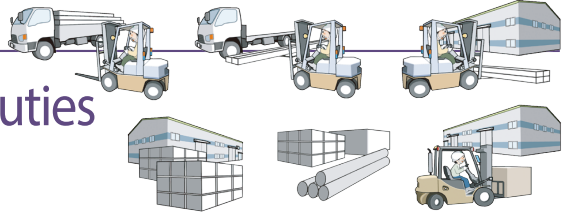
02

Major risk&Hazard factors



01

Overview by processes/duties



Overview by processes/duties

① Warehousing of raw materials

Raw materials (objects to be plated) transported by trucks are delivered to a loading station by means of unloading machinery, such as forklifts.



② Preparation

Raw materials to be plated are sorted by similar product groups or to loading jigs in order to ensure expediting the plating works.



③ Acid cleaning & water washing

Rusts or other foreign substances are removed from the surface of the object to be plated with sulfuric acid or chloride solutions, and the surface is cleaned with water.



④ Flux treatment & drying

It is to remove foreign substances from the surface by inserting the object for plating in the flux tank, and to remove moisture from the surface after processing the object to be effective for plating.



5 Molten zinc plating

It is to put the object for plating into the zinc plating tank in order to form zinc plating films.



6 Cooling

It is to cool down the product for a specified period and clean at the same time in order to maintain stable plating conditions.



7 Post-processing & inspection

It is to remove oxidants from the surface of the object for plating, to smooth the surface and to examine the conformity with the specifications.



8 Packaging & shipping

It is to package the products finished with plating works and to load the products to the truck by using loading/unloading machinery.



02

Major risk and hazard factors



1 Warehousing of raw materials

Raw materials (objects to be plated) transported by trucks are delivered to a loading station by means of unloading machinery, such as forklifts.

Details by processes/duties



Risk/hazard factors	Preventive measures
• Risks for raw materials to fall from the forklift	• Safe loading of raw materials at the fork and prohibition of sudden turns/starts
• Risks for collision with the workers in the back when backing up due to failure to install or damages to the backup warning of the forklift	• Installation of backup warning or monitor at forklifts and placement of supervisor
• Risks for collision with forklifts when workers approach within the operation radius of forklifts	• Procurement of sufficient working space for forklifts, establishment of restricted areas for workers, and placement of supervisor

Risk/hazard factors 	Preventive measures 
• Risks for workers riding on the forklift other than driver's seat to fall off	• Prohibiting workers from riding except at the driver's seat • Placement of and instruction by supervisor
• Risks for a forklift to overturn due to sudden turns or negligence when the forklift travels on downhill	• Installation & wearing of safety belt at the driver's seat • Installation of access door at the driver's seat of forklift
• Risks for a forklift to collide with workers or overturn due to excessive speed	• Designation of operating speed for forklifts • Installation & wearing of safety belt at the driver's seat
• Risks for accidents from operations by unskilled or unlicensed worker as the ignition key is left on the idle forklift	• Separation and separate storage of ignition key of forklifts • Designation of person in charge of operating a forklift
• Risks for workers to collide with forklifts or trip off the objects due to failure to secure pathways	• Arrangement/organization of worksite & procurement of pathways
• Risks for workers to get trapped as loaded raw materials fall down	• All raw materials in irregular shapes shall be stored at dedicated storage shelves
• Risks for musculoskeletal disease due to loading/unloading of heavy objects	• Use of 4-wheeled hand carts • Appropriate distribution of working/ resting hours and implementation of regular stretching • "Installation of signs for "Caution for Handling of Heavy Objects"
Major equipment • Truck, forklift Accident cases • Collision with forklift	Part III. Practical Information on Safety & Health • Worksite pathways • Unloading & transporting machinery of vehicle type • Transporting works by forklifts

2 Preparation

Raw materials to be plated are sorted by similar product groups or to loading jigs in order to ensure expediting the plating works.

Details by processes/duties



Risk/hazard factors ⚠️	Preventive measures 🔔
• Risks for musculoskeletal disease due to inadequate posture and repeated works • Risks for injuries, i.e. backache, due to excessive movements, such as handling of heavy objects	• Investigation of harmful factors for duties burdening the musculoskeletal system • Sufficient rests & proper stretching practice • Guidance on weight and center of mass for handling objects • Use of equipment replacing human transportation, i.e. 4-wheeled hand carts
• Risks for tripping off the objects on the floor or slipping and falling on the floor stained with water or oil while moving around the worksite	• Procurement & indication of safety pathway • To maintain the floor of worksites clean • Maintenance of proper illumination within worksites
• Risks for piercing or cuts by wires during sorting and binding raw materials	• Wearing of protective gloves

Risk/hazard factors 	Preventive measures 
• Risks for cargo to fall or for workers to collide with cargo while the crane is in use • Risks for collision or trapping by equipment or cargo due to mal-operation of crane	• Pre-survey and preparation of work plan handling heavy objects • Use of hanging apparatus and tail-piece suitable to the cargo • Indication of operational direction on the pendant switch and crane (hoist)
Major equipment • Forklift, crane Accident cases • Collision with crane	Part III. Practical Information on Safety & Health • Floor of worksite • Worksite pathways • Works prone for musculoskeletal disease • Crane operation • Operations handling tail-piece & hanging apparatus

3 Acid cleaning & water washing

Rusts or other foreign substances are removed from the surface of the object to be plated with sulfuric acid or chloride solutions, and the surface is cleaned with water.

Details by processes/duties



Risk/hazard factors 	Preventive measures 
Risks for health problems due to generation of harmful mist during acid-cleaning using hydrochloric acid and sulfuric acid	- Handling with sufficient awareness of risks for fire/explosion/poisoning and properties of materials - On-site display of related MSDS and implementation of training to help related workers - Risks for object's properties, fire, explosion, contact and poisoning
Risks for acidic solution to spill off when the object for plating is inserted into the acid-cleaning tank by means of a crane	- When operations close to the acid-cleaning tank are required, approach after the object is completely placed in the tank. - Installation of washing & cleaning facilities at easily accessible locations
Risks for workers to fall into an acid-cleaning tank during insertion and lifting of the object for plating	Installation of safety rails to prevent falling near the acid-cleaning tank; but under the consideration of working situations
Risks for leakage and burns when hydrochloric acid and sulfuric acid is left at the worksite	Since strong acid generates critical steams through reaction with moisture in the air, it should be stored in a sealed container and stored at designated locations when not in use.
Risks for health problems due to failure to wear personal protective gear	- Wearing of protective goggles to prevent eye contacts with chemicals, i.e. hydrochloric acid - Wearing of protective clothing and protective gloves to prevent skin contacts - Wearing of face-shield, heat-resistant protective clothes and fire extinguisher for risks of fire/explosion and wearing of chemical-resistant gloves and gas mask for risks of poisoning
Major equipment - Acid-cleaning tank, water-washing tank, local ventilation equipment, crane, etc. Accident cases - Falling into acid-cleaning tank during sample collection, and burns	Part III. Practical Information on Safety & Health - Worksite pathways - Crane operation - Operations handling tail-piece & hanging apparatus - Handling of harmful chemicals - Safe operation of acid-cleaning tank

4 Flux treatment & drying

It is to remove foreign substances from the surface by inserting the object for plating in the flux tank, and to remove moisture from the surface after processing the object to be effective for plating.

- In cases of molten zinc plating, it shall be processed with a mixed solution of zinc chloride (ZnCl_2) and ammonium chloride (NH_4Cl) with the temperature of 50 to 80°C and 5 minutes of settling time.

Details by processes/duties



Risk/hazard factors !	Preventive measures 🔔
• Risks for health problems due to chemicals	• Display/posting/training of MSDS • Posting of name of chemicals and control instructions • Installation of hood of local ventilation equipment at each emission source • Maintenance of properly controlled wind speed at each hood • Issuance and wearing of protective gloves and respiratory protective gear • Improvement of working environment ensuring sufficient ventilation • Implementation of safety/health measures of MSDS • Prohibition of anyone who is not an employee from accessing • Clean maintenance of worksite floors

Risk/hazard factors 	Preventive measures 
• Risks for falling of cargo during the use of crane • Risks for collision and trapping of equipment or cargo due to mal-operation of crane	• Pre-survey and preparation of work plan handling heavy objects • Use of hanging apparatus and tail-piece suitable to the cargo • Indication of operational direction on the pendant switch and hoist
• Risks for workers to fall into a flux tank during insertion and lifting of the plated object	• Installation of standard safety rails with height of 90 to 120cm in order to prevent workers from falling near the flux tank • Implementation of arrangement/organization after removing water and oils from the floors near the flux tank
Major equipment • Flux tank, local ventilation equipment, crane, etc. Accident cases • Falling into a flux tank	Part III. Practical Information on Safety & Health • Worksite pathways • Crane operation • Operations handling tail-piece & hanging apparatus • Handling of harmful chemicals • Safe operation of acid-cleaning tank

5 Molten zinc plating

It is to put the object for plating into the zinc plating tank in order to form zinc plating films.

· For one to ten minutes based on the required thickness at the temperature of 430°C to 460°C

Details by processes/duties



Risk/hazard factors ⚠️	Preventive measures 🚨
• Risks for hot molten material to spill off when the object for plating is inserted into the plating bath by a crane	• It is to ensure the water not to be on the floor of the pit or building structure or other equipment handling hot molten materials in order to prevent vapor explosion • When operations close to the plating bath are required, approach after the plating object is completely placed in the tank. • Installation of safe shelter for workers from scattering molten materials near the plating bath • When inserting zinc into the plating bath, it is to insert it after verifying that no water is in the bath in order to prevent vapor explosion. • Restriction on workers from accessing near the plating bath and storage of fire at separate locations

Risk/hazard factors 	Preventive measures 
Risks for workers to fall into the plating bath during insertion and lifting of the object for plating	- Installation of standard safety rails to prevent workers from falling near the plating bath; but the installation shall be robust in an on-off type under the consideration of working situations - Check for possibilities if workers collide with other workers during crane operations
Risks for health problems due to zinc fume generated from the plating bath	- Display/posting of MSDS concerning harmful substances handled within the worksite and training of workers - Check for operation of local ventilation equipment and whether any obstructions exist near open holes of the hood
High-heat environment at worksites due to high-temperature heating during melting	Issuance and wearing of heatproof clothes or other proper protective gears in order to prevent risks of burns at the sites where high-temperature objects are handled
Risks for health problems and burns due to failure to put on personal protective gear	- Wearing of personal protective gear, i.e. chemical-resistant gloves and heat-resistant clothes, in order to prevent health problems - Wearing of face-shield, heat-resistant protective clothes and fire extinguisher for risks of fire/explosion and wearing of chemical-resistant gloves and gas mask for risks of poisoning
Major equipment - Plating bath, local ventilation equipment, crane, etc. Accident cases - Falling and burns during zinc plating works	Part III. Practical Information on Safety & Health - Worksite pathways - Crane operation - Operations handling tail-piece & hanging apparatus - Handling of harmful chemicals - Safe operation of plating bath

6 Cooling

It is to cool down the product for a specified period and clean at the same time in order to maintain stable plating conditions.

Details by processes/duties



Risk/hazard factors 	Preventive measures 
• Risks for falling when the upper part of cooling tank partitions with narrow width are used as operation pathways	• Prohibit workers from approaching by installing fences around the cooling tank prone for risk of falling
• Risks for falling and tripping during crane (hoist) transportation works of heavy objects with various sizes and weights	• Preparation of work plans concerning safety measures capable of preventing the risks of falling and tripping for workers handling heavy objects, and implementation of operations according to the plan concerned • Sufficient notification of the details within the work plans to the workers
• Risks for trapping in the power transmission section during maintenance and repair works of facilities	• Installation of protective cover at the power transmission section • Operation stoppage prior to cleaning and repair works • Installation of signs prohibiting the operation of control panel

Risk/hazard factors 	Preventive measures 
• Risks of falling and collision due to projected parts and obstacles during travelling through pathways and stairways	• Corrective measures to remove projected parts and obstacles at the pedestrian pathways • Preventive measure for slipping and installation of safety rails in stairways • Maintenance of proper illumination within worksites
• Risks of electric shocks due to electric leakage and contacts with the live part of electric machinery/apparatus, such as pumps • Risks of electric shocks due to inadequate insulation of illumination lights and wires	• Protective measure for the live part to be the closed-type electrical box • Insulation and earthing of the live part • Shut-off of electric pathway and procurement of work space prior to operations • Attachment of tags when electric pathways are shut off • Prohibition of using ladders with electrical conductive materials
Major equipment • Cooling tank, crane, etc. Accident cases • Burns by vapor emission from a cooling tank	Part III. Practical Information on Safety & Health • Worksite pathways • Crane operation • Operations handling tail-piece & hanging apparatus • Operations handling electric machinery/apparatus

7 Post-processing & inspection

It is to remove oxidants from the surface of the object for plating, to smooth the surface and to examine the conformity with the specifications.

Details by processes/duties



Risk/hazard factors 	Preventive measures 
• Risks of noise deafness due to noises generated during grinding works • Risks of damages to eyes by flying chips during grinding works	• Wearing of personal protective gears, i.e. ear plugs and earmuffs • Wearing of protective glasses
• Risks for musculoskeletal disease due to human transportation of heavy objects, such as tools, or repeated operations	• Stretching prior to operations • Restriction on weights in order to lessen the burdens on musculoskeletal system, such as neck and waist • Balanced distribution of working hours and resting hours
• Risks of cuts from sharp areas on the surface of plated objects during inspection	• Wearing of protective gear (safety gloves, etc.) suitable to working conditions
• Risks of electric shocks due to electric leakage of mobile electric machine/apparatus	• Implementation of protective measures at live parts • Connection of mobile electric machine/apparatus to an earth leakage breaker • Insulation of wires and connecting parts prior to operations

Risk/hazard factors 	Preventive measures 
Major equipment • Mobile grinder, file, etc. Accident cases • Onset of musculoskeletal disease due to human transportation works	Part III. Practical Information on Safety & Health • Safe grinding operation • Safe human transportation works • Safety for musculoskeletal disease risks • Operations handling mobile electric machine/apparatus

8 Packaging & shipping

It is to package the products finished with plating works and to load the products to the truck by using loading/unloading machinery.

Details by processes/duties



Risk/hazard factors 	Preventive measures 
• Risks of trapping and collision during transportation works by transportation equipment, such as forklifts • Risks of cuts from finger trapping during the use of automatic packing machine	• Indication of separation of pathways for workers and transportation equipment by a yellow straight line • Wearing of protective gloves suitable to working conditions and balanced distribution of resting hours in order to help focusing on given duties

Risk/hazard factors 	Preventive measures 
• Risks of collision, trapping and falling during forklift operations	• Designated drivers with proper qualifications • Comply with safety loads and secure views • Wearing of seat belt while driving
• Risks of collision and tripping due to unprotected objects on the floor of worksites, failure to secure pathways and inadequate illumination	• Arrangement/organization of worksite & procurement of pathways • Maintenance of illumination suitable to working conditions and pathways
• Risks for musculoskeletal disease due to repeated packing works and transportation of printed materials	• Improvement of working environment through installation of convenient facilities, i.e. fatigue-prevention mats • Balanced distribution of working hours and resting hours • Use of transportation supplementary equipment, such as 4-wheeled hand carts
• Risks of collision due to frequent movements of trucks • Risks of falling when trucks access the cage for unloading works • Risks of falling due to loss of footing when getting off the vehicle	• Preparation of work plans (unloading machines on vehicles, handling of heavy materials) and compliance with work procedures • Designation of supervisor and placement of guardian
• Risks of traffic accidents due to ignorance of traffic signals and excessive speeding while driving a vehicle • Risks of slipping due to negligent driving on rainy/snowy roads	• To maintain the sufficient distance between vehicles, strictly keep eyes on the road, put on seat belts and reduce the speed on the rainy road • Prohibition of unsafe behaviors while driving, including smoking, talking on the cell phone and watching visual images
Major equipment • Forklift, crane Accident cases • Collision with crane	Part III. Practical Information on Safety & Health • Floor of worksite • Worksite pathways • Works prone for musculoskeletal disease • Crane operation • Operations handling tail-piece & hanging apparatus

안전은 권리입니다

Ten Commandments of Occupational Safety and Health for Employers and Workers

사업주와 근로자가 꼭 알아야 할 산업현장 안전보건수칙 10계명

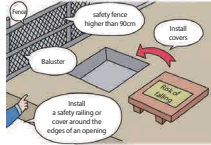
※ Workers who notice a symptom of health problems must immediately report to the supervisor to receive medical attention and notify the Ministry of Employment and Labor.

신체에 이상 증상이 나타나면 관리자에게 보고, 의사 진료 및 고용노동부에 통보하여야 함

01

Employers must install a safety railing and safety cover in places where workers can fall or trip.

추락, 넘어질 위험이 있는 장소에 안전 난간, 개구부 덮개 등 설치



02

Employers must issue appropriate personal protective equipment, and workers must wear the issued personal protective equipment.

작업에 적합한 개인 보호구 지급 및 착용



03

Employers must install appropriate safety devices on dangerous/hazardous equipment such as a press, a shearing machine, or a pressurized container.

프레스 등 유해 위험기계 · 기구를 사용 시, 적합한 방호장치를 설치



04

Employers must install a lock on the start switch of machines and facilities undergoing maintenance, and place a "Maintenance in Progress" sign.

기계 · 설비 정비 시 기동 장치에 잠금장치 및 표지판 부착



05

It is employers' responsibility to perform a pre-work safety inspection, and keep work areas organized and tidy.

작업 전 안전점검 및 정리정돈 실시



06

Employers must secure a safety passage to, from, and within the work area.

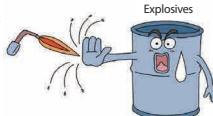
작업장으로 통하는 장소 또는 작업장 내 안전통로 확보



07

Employers must keep inflammables and combustibles from sites where there is welding or cutting taking place.

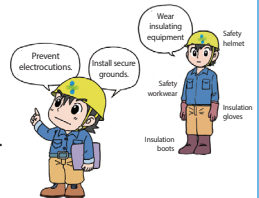
금속의 용접 · 용단 등의 작업 시 인화성 · 폭발성 물질 격리



08

Employers must install groundings on electrical equipment, and issue insulating equipment to workers for use when performing all electrical tasks.

전기작업 시 접지작업에 적합한 절연용 보호구 지급 및 착용



09

Employers must place warning signs on containers holding dangerous and hazardous chemicals.

유해 · 위험 화학물질 취급 용기 등에 경고 표지 부착



10

When a worker is working in a confined space, the employer must measure the oxygen level before and during work.

밀폐공간 작업 전 · 작업 중 산소농도 등 측정



Safety and Health for Molten Plating Business

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