Medal Craftsmanship

Design	Create sketches of medals based on customer needs or designer inspiration. Determine the style and size of the medal, considering material characteristics and processing techniques.
Material Selection	Choose appropriate metal or gemstone materials. Ensure the medal's durability and aesthetics while considering costs and material availability.
Casting	Use lost-wax casting or metal casting techniques to create the initial shape of the medal. Form the basic structure of the medal, controlling casting temperature and environment.
Forging	Shape the metal by hand or mechanically to refine the medal's shape and details, ensuring the metal's plasticity during the forging process.
Inlaying	Embed gemstones into the metal framework of the medal to enhance its beauty and value while protecting the stones from damage.
Welding	Connect different parts of the medal together at high temperatures, ensuring structural stability while controlling welding temperature and time.
Engraving Process	Engraving is widely used in medal decoration, allowing for various shapes, sizes, and designs, from simple flat medals to complex three-dimensional ones.
Polishing	Use different grits of sandpaper and polishing tools to smooth the medal's surface, enhancing its shine while avoiding excessive polishing that could damage the metal.
Surface Treatment	Different surface and forming techniques lead to significant variations in the medal's appearance. Each technique has its advantages and limitations, so choosing the right one is crucial for the final product's quality and effect.
Cleaning and Packaging	Clean polishing and plating residues from the medal and package it for market readiness, ensuring it is protected during transport and display.

Medal Design Process

The medal design process transforms creativity and aesthetics into physical ornaments, involving multiple steps from concept to final product.

Market Research	Study target markets and consumer preferences to determine design direction and style, considering trends and target demographics.
Design Concept	Develop themes and styles for the medal based on research results, forming preliminary ideas while considering originality and feasibility.
Sketching	Transform design concepts into visual sketches, visualizing ideas using professional drawing tools or software.

Material Pairing Selection

Different materials significantly affect appearance and use.

Metal	Includes brass, iron, stainless steel, titanium, etc., easy to process.
Jade	Warm texture, diverse colors.
Agate	Bright colors, high hardness.
Crystal	Transparent or translucent, high refractive index. Acrylic: Lightweight, diverse colors, inexpensive.
Cubic Zirconia	High hardness, diamond-like refractive index.
Gold	Precious, soft, resistant to corrosion.
Silver	Good luster, moderate price, easy to process.
Aluminum	Lightweight, inexpensive

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Metal Materials and Forging Melting Points

The melting point depends on material properties and processing techniques.

Material	Melting Point Temperature	Characteristics
Gold	1064.4° C	Soft texture, easy to process
Platinum	1772° C	Rare and corrosion-resistant, high purity
Palladium	1772° C	Rare and corrosion-resistant, high purity
Titanium	1668° C	Lightweight and hard, corrosion-resistant
Tungsten	3422° C	Hard and wear-resistant, exhibits a deep gray luster
Copper	1084.5° C	Easy to process but prone to oxidation
Aluminum	660.4° C	Lightweight and low cost
Iron	1538° C	Common metal, low cost
Brass	950° C	Easy to process, warm color

Medal Forging Process

Forging a medal is a technique that transforms metal into exquisite ornaments. Craftsmen must precisely control the heating temperature to achieve the desired softness and malleability. At suitable temperatures, metal becomes easier to shape, allowing craftsmen to gradually form the required medal shape using specialized

Forging	Heat and strike the metal by hand or mechanically to shape it. Gold, silver, copper, alloys. Heating temperature: below melting point

Forging	Silver, copper, alloys. Heating temperature: below melting point, typically 500° C to 1000° C.
Hammering	Use a hammer to shape the metal, with the number of strikes depending on complexity, possibly requiring hundreds. Use molds and stamping equipment to create the final medal shape, controlling pressure between 10 to 50 tons.
Stamping Process	This is the most common method for creating badges, typically using copper, iron, or aluminum. Stamped badges use molds to create clear, layered designs, with subsequent treatments to enhance metal quality and aesthetics.
ie Casting Proces	Die-cast badges usually use zinc alloy due to its low melting point, allowing for intricate designs. They exhibit strong detail and are suitable for three-dimensional and intricate patterns.

Medal Welding Process

The welding process involves fusing two or more metal components at high temperatures to form strong, attractive connections, requiring precision and strict temperature control to prevent excessive melting. Each technique has specific applications and aesthetic effects.	
Laser Welding	An advanced technique suitable for connecting precision components, achieving fine joint points while minimizing heat-affected zones.
Flame Welding	Still widely used in the jewelry industry, this method allows for strong connections between metals by controlling flame temperature and intensity.
Resistance Welding	Utilizes heat generated by current passing through contact points, ideal for small parts but less suitable for larger, complex structures.
Ultrasonic Welding	Uses high-frequency vibrations to create friction heat, merging metal surfaces, particularly effective for thin materials.

Medal Inlay Techniques

Different inlay techniques can create unique visual effects on medals.	
Stone Inlay	Gemstones (like diamonds, rubies, sapphires) embedded in a metal base.

Claw Setting	Metal claws hold larger gemstones, showcasing more of their surface.
Bezel Setting	Gemstones are completely surrounded and secured by a metal frame, offering good protection for everyday wear.
Pavé Setting	Multiple small gemstones arranged closely together, held by tiny metal claws for a sparkling surface.
Channel Setting	Metal channels tightly hold multiple gemstones, suitable for linear arrangements.
Micro Setting	Tiny gemstones arranged closely, held by tiny claws for a shiny, flat surface.
Pearl Inlay	Pearls are set into the surface of the medal, usually secured with metal rings for elegance.

Medal Engraving Techniques

Different engraving techniques enhance the medal’s design.

CNC Engraving	Provides efficient and precise processing, particularly for complex designs requiring mass production.
Laser Engraving	Uses high-energy lasers to engrave designs and text on metal surfaces, ideal for customized medals.
Hand Engraving	A traditional method where artisans directly carve patterns onto metal, creating unique artworks despite higher costs and longer time.

Medal Polishing Techniques

Polishing is key to achieving brightness.

Hand Polishing	Manual sanding with various grits to remove surface imperfections until achieving the desired smoothness.
Mechanical Polishing	Uses polishing machines and materials (like cloth wheels) for high-speed polishing to enhance efficiency and consistency.
Vibratory Polishing	Medals placed in a vibratory machine with polishing media, achieving even surface smoothing.
Electrolytic Polishing	A chemical method that smooths surfaces using electric current through an electrolyte solution.
Ultrasonic Polishing	Uses ultrasonic vibrations to remove minute surface imperfections, effective for complex shapes.
Tumbling Polishing	Medals and polishing materials placed in a tumbler for polishing via rotation.

Medal Surface Treatments

The final step in determining appearance is shaping and surface treatment.

Enamel Technique	A traditional coloring method using red copper as the base. Patterns are carved into the surface, filled with enamel powder, and fired to create a smooth colored finish, popular for vibrant and durable colors.
Imitation Enamel Technique	Similar to enamel but uses liquid pigments instead of powder, requiring contour carving and curing for a cost-effective visual effect.
Etching Technique	Uses chemicals to etch patterns into metal surfaces, suitable for creating textured designs.
Baking Paint Technique	A modern coloring method for metal badges, applying a thin paint layer and baking for durability.
Epoxy Resin Technique	A layer of transparent epoxy resin is applied to protect color and enhance three-dimensionality and gloss.

Printing Technique	For complex patterns or color gradients, methods like screen printing or heat transfer can directly print on surfaces, suitable for non-metal materials.
Electroplating	While not a coloring process itself, it alters the metallic appearance through coatings like nickel, gold, or silver, often enhancing the badge’s high-end feel.

Polishing and cleaning process for medals

In the final stage of medal production, the polishing and cleaning methods vary depending on the style of the medal.

Hand Polishing	Artisans manually polish the medal with polishing cloths and compounds to remove any surface scratches or stains, restoring the metal’s luster.
Ultrasonic Cleaning	Uses an ultrasonic cleaning machine to create tiny bubbles through high-frequency sound waves, effectively removing dust, grease, and other small particles from the medal.
Steam Cleaning	Utilizes the heat from steam and the action of cleaning agents for deep cleaning. This method is suitable for complex designs, reaching difficult-to-clean areas.
Chemical Cleaning	In certain cases, specific chemical cleaners may be used to remove stubborn stains or oxidation. This step requires strict control to avoid damaging the metal or gemstones.
Electrochemical Cleaning	Uses electrolytic action to remove oxides and impurities from the metal surface. This method is commonly used for cleaning precious metals.
Heat Treatment Cleaning	For certain metals like stainless steel, a brief high-temperature treatment can clean the surface, effectively removing oils and oxides.
Water Washing	In some cases, simple water washing with mild soap can be used for cleaning. Afterward, the medal must be thoroughly rinsed and dried.
Final Inspection	After cleaning, each medal undergoes a final visual and physical inspection to ensure no stains or defects are overlooked.
Drying Treatment	Cleaned medals need to be thoroughly dried to prevent water spots or damage from moisture. Soft cloths or cool air can be used for drying.

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Protective Treatment	In some cases, additional protective treatment may be applied after cleaning, such as a thin layer of protective oil or wax to prevent future contamination and wear.

Medal Packaging Types and Processes

Medal packaging also varies in craftsmanship, with different styles of boxes representing various meanings.

Classic Jewelry Box	Material: Leather. Style: Classic Style A. Bag Type: Non-woven Bag. Material: Non-woven Fabric. Style: Classic Style A.
Display Box	Material: Acrylic. Style: Display Style B. Bag Type: Transparent Plastic Bag. Material: PVC. Style: Display Style B.
Gift Box	Material: Cardboard. Style: Gift Style C. Bag Type: Gift Paper Bag. Material: Coated Paper. Style: Gift Style C.
Economy Box	Material: Cardboard. Style: Economy Style D. Bag Type: Economy Plastic Bag. Material: Plastic. Style: Economy Style D.
Travel Box	Material: Metal. Style: Travel Style E. Bag Type: Travel Storage Bag. Material: Nylon. Style: Travel Style E.