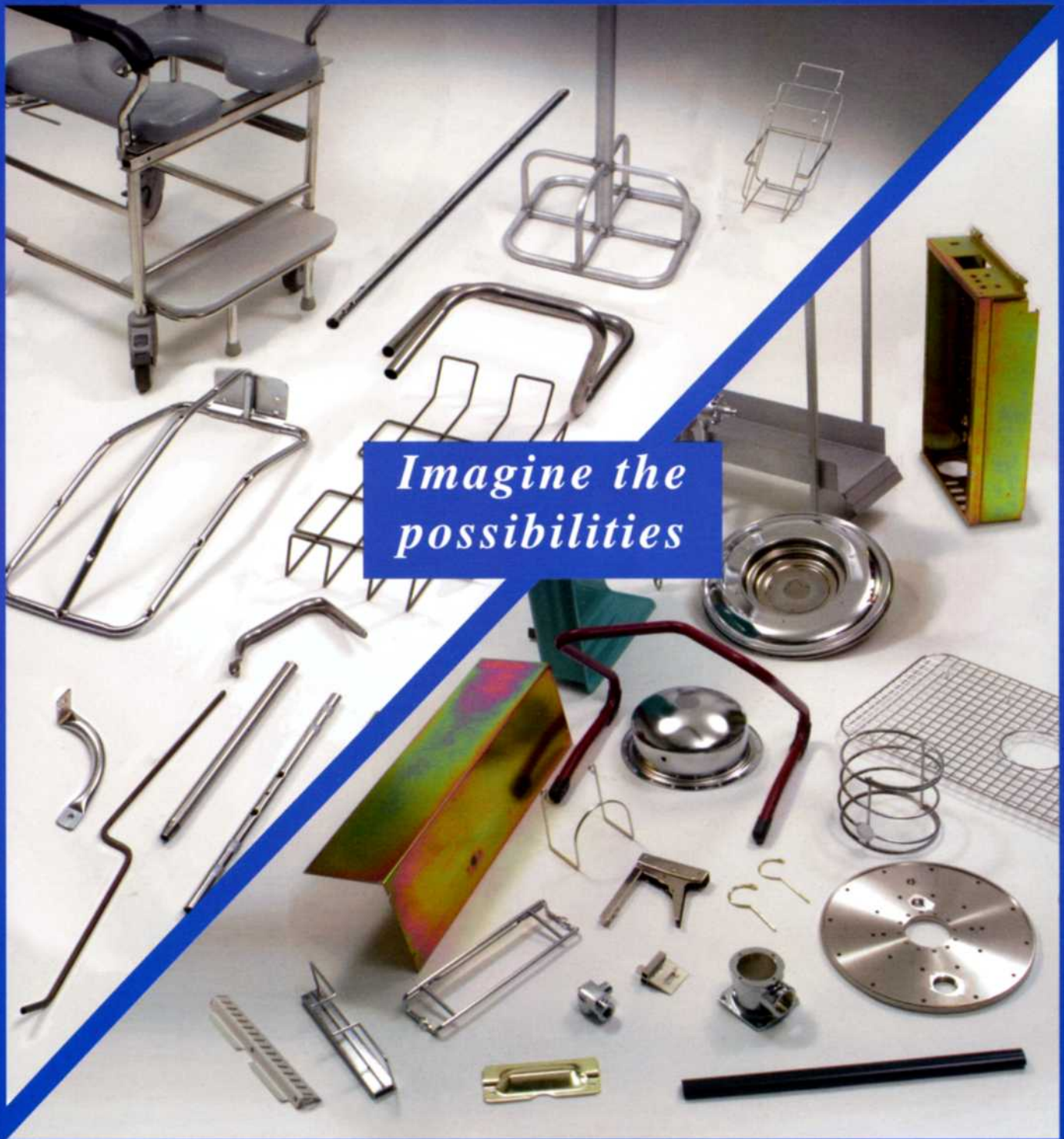




**WORCESTER MANUFACTURING, INC.**

**Metal Fabrication by Worcester Chrome**



*Imagine the possibilities*

**Metal Finishing by Independent Plating**

# METAL FABRICATION BY WORCESTER CHROME

From component fabrication to complete product manufacturing.  
Common metals include steel, stainless steel, aluminum, brass and bronze.

## TUBING

### BENDING

**Rotary Bending** —  $\frac{3}{8}$ " to 3" diameter round with  $1\frac{1}{4}$ " to 10" radius  
Rotary draw bending uses mandrels and dies to control metal flow. We place a mandrel inside the tube while a die or dies surround the tube. The bend can be carefully controlled and the tube's diameter accurately maintained. We recommend rotary draw bending where bend radii are tight or bend deformation is unacceptable.

**Vertical Bending** —  $\frac{3}{8}$ " to  $1\frac{1}{4}$ " diameter tubing with as much as 4" radius bend.

Vertical compression bending is the most cost effective process for tube fabrication. Strength of bent assemblies is equal to rotary bent parts despite the small deformation that occurs on the inside of the bend.

### SECONDARY OPERATIONS

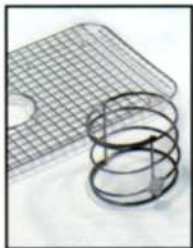
**Dimpled Punching** is the least costly process for making holes. Without a die behind the tube wall, the punch produces a small depression (dimple) around the hole. This provides a countersink for flat and oval head fasteners without secondary operations.

**Flush Punching, or Mandrel Punching**, leaves no dimple. A mandrel or die must be placed behind the place to be punched. It is more expensive than dimpled punching but less expensive than drilling.

**Drilling** provides a flush hole. It is used for large hole-to-tube diameter ratios. It is also used where hole location does not permit insertion of a mandrel.

### SWAGING — $\frac{1}{4}$ " to $1\frac{3}{4}$ " diameter

Swaging is more than simply squeezing a part. With it, we can reconfigure the shape of tubes, wires and rods. We can change the outside diameter on tube ends to provide telescoping assembly. We taper tubes to regulate flow, improve aesthetics, and expand the inside diameter for a flange or coupling.



### WIRE AND ROD

**Straighten and Cut** — 0.0910" to 0.500" diameter  
**Bend** — Single, double and complex bends  
**Flatten and Punch**

We straighten, cut, bend, flatten, twist, shear, punch and weld wire and rod.

## FLAT STOCK

### AUTOMATIC PRESSES — to 60 ton

Our automatic presses have built-in electrical and pneumatic controls that automatically feed strip in synch with press action. This reduces operator involvement and product cost.

### PRESS BRAKES — to 8 feet

Our press brakes bend, blank, curl, notch, perforate and punch.

## WELDING

At Worcester Mfg., we do MIG, TIG and resistance welding, giving us enormous welding flexibility. We work in steel, stainless steel and aluminum.



**MIG** (Metal Inert Gas) welding is semi-automatic, in which wire is continuously fed from a spool. It is rapid and inexpensive. High volume parts are welded robotically with capacity for assemblies up to 30" x 36" x 84".

**TIG** (Tungsten Inert Gas) is also known as Gas Tungsten Welding, or GTAW. We use TIG in high precision welding applications and for reactive metals such as aluminum.

**Resistance Welding** is a very cost-effective process for joining wire and sheet metal through the coordinated application of electric current and mechanical pressure in precise, repetitive intervals. Machine capacities to 100kva join up to 0.500" diameter wire or up to 8-gage flat stock.

## CONTRACT MANUFACTURING

Complete product fabrication, finishing, assembly, packing and shipping take your product from your concept to your customer. Confidentiality agreements are always in place.

*This one-piece toolcart handle replaced a complex, multi-part fabricated assembly.*

*We cut 1" steel tubing to length and designed tooling to double-bend, flatten, trim and punch mounting holes, then we nickel-chrome electroplated it. This resulted in a stronger, more attractive handle and saved our customer significant cost.*



SECONDARY OPERATIONS • Assembly • Beading • Deburring • Expanding • Flattening • Mitering • Notching • Finishing

# METAL FINISHING BY INDEPENDENT PLATING

We electroplate, electropolish and powder coat.  
We meet ASTM, Federal QQ and AMS commercial specs.

## ELECTROPLATING

Part sizes to 36" x 36" x 60"

In electroplating we deposit a metallic coating on a metal part. We apply a negative electrical charge to the part and dip it in a solution containing a positively-charged salt of the metal to be deposited. With multi-stage precleaning in our automatic equipment, an atomic bond forms with the substrate creating a hard, long-lasting plate of the metal on the part. The plate carries all the qualities of the coating metal.

An established, trusted finishing method, we electroplate in different metals and thicknesses to make finished products attractive, provide wear resistance and protect parts that may be exposed to moisture and harsh elements. Electroplated parts are found in practically every industry.

RoHS compliant coatings available.

## ELECTROPOLISHING

Part sizes to 20" x 68" x 34"

Electropolishing is an electrochemical process sometimes known as "reverse plating." As in electroplating, an electric current passes between the part and a bath, but in this case some surface metal is actually removed, along with oxides and impurities.

We often electropolish stainless steel for medical, pharmaceutical and foodservice applications. Because hydrogen is also removed from the surface of the part, bacteria cannot grow on it, making electropolishing the finish of choice where sanitation is critical.

Electropolishing leaves a smooth, clean, high luster surface with low friction, excellent heat and light reflection and with improved corrosion-resistance and passivity.

## POWDER COATING

Epoxy, polyester & hybrid coatings

Automatic conveyor system accommodating parts up to 30" x 60" x 84"

Five stage iron phosphate pretreatment and seal

Electrostatic powder deposition

Fusing and cure to 450°F

Powder coating uses a mixture of finely ground pigments and resin, which we spray on an electrically-charged metal surface. We then heat the part, fusing the powder coat into a smooth, uniform and durable finish. It is economical, attractive, color-fast, and resistant to chipping, scratching, and wearing. We can finish in many colors with high or low gloss, even in metallic and clear finishes. Textures can range from smooth to wrinkled, matte or rough. Powder coating is environmentally friendly, without solvents or potentially polluting solutions.

We use powder coating for products like dishwasher and microwave racks, decorative trim, filters, modular furniture, fencing, lighting fixtures, antennas, electrical components, exercise equipment, display racks, lawn mowers, patio furniture and garden tools.

## ELECTROPLATING METALS & PART SIZES

**NICKEL/CHROME** Bright nickel plate on steel  
Hex chrome surface layer  
Part sizes to 36" x 36" x 60"  
Thin panels to 48" x 48" x 60"  
Capacity to 50,000 parts per day

**ZINC** Bright zinc plating on steel;  
non-cyanide process  
Protective chromate surface layer,  
lacquer coated  
Part sizes to 36" x 36" x 60"  
Thin panels to 48" x 48" x 60"

**BRASS** Lustrous brass on bright nickel substrate  
Clear lacquer coating to prevent tarnish  
Part sizes to 36" x 36" x 60"  
Thin panels to 48" x 48" x 60"

**HARD CHROME** Part sizes to 28" x 96" x 64"

**ELECTROLESS NICKEL** Part sizes to 36" x 48" x 96"

## CHEMICAL TREATMENT

Part sizes to 36" x 36" x 60"

Pickling • Etching • Passivating • Chromating • Cleaning



*Our large, automatic plating equipment provides precise process control, repeatable quality, high volume capability and low cost.*

# WORCESTER MANUFACTURING, INC.

For more than 50 years Worcester Manufacturing, Inc., has been fabricating and finishing wire, rod, tube and strip, making practical, quality parts and finished products. With nearly 100 employees, we are one of the larger metalworking operations in the Northeast, with a broad range of skills and an abundance of machinery capable of long, complicated production runs.

We divide ourselves into two metalworking divisions.

## **Independent Plating Company**

Electroplating, electropolishing and electrostatic powder coating.

## **Worcester Chrome Furniture Manufacturing Company**

Tube and rod bending, wire fabrication, strip handling and product assembly.

*Worcester Chrome Furniture produces parts and finished products for OEMs and end-users in many different markets, not only furniture.*

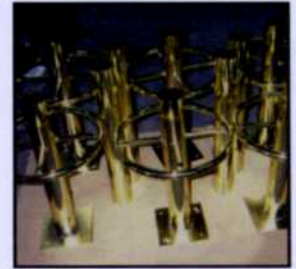
Both divisions are located in 140,000 feet of refurbished factory space in Worcester, Massachusetts, a trucking hub only a few hours away from locations as far away as Washington D.C. and western New York State. We are also served by good railroad connections and, naturally, air freight.



Because of our exclusive commitment to certain kinds of metalworking, we believe our expertise results in excellent product at low cost. We serve both large and small companies and frequently find ourselves called upon to assist with new product lines and products needing upgrades and different manufacturing technologies.



*Tube and wire fabrication,  
nickel/chrome plated*



*Brass plating*



*Electroless nickel plating*



*Hard chrome finish*



*Electropolishing*



*Chemical cleaning and  
degreasing*



*Powder coating*



*Stainless product  
fabrication*



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