Industrial Pure Iron 50-150HV

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Discover the Truth of Material

Purpose:

Industrial pure iron is a type of steel primarily composed of iron (99.50%—99.90%) with carbon content below 0.04%. Though not entirely pure iron, it is classified as such due to its near-pure composition. Industrial pure iron is exceptionally soft, highly ductile, and exhibits excellent electromagnetic properties. Common applications include:

1.Deep-drawing material: Capable of being stamped into highly complex shapes.

2.Electromagnetic material: Offers high magnetic permeability and low magnetic resistance.

Recommended Equipment and Consumables (select grinding/ polishing consumables based on sample conditions):



Beta-300 Pro Automatic Cutting Machine

Recommended parameters for different specimen size				
Sample size/ diameter (mm)	25	30	40	50
Individual force loading mode, individual sample pressure force (N)	-5	0	+(5~10)	+(5~10)

*Standard pressure: ϕ30mm (adjust according to sample size).

Cutting

Equipment	Beta-300 Pro Automatic Cutting Machine	
Cut-off wheel	A30 alumina abrasive cut-off wheel	Order No: 01.01.360
Cutting Coolant	TJ1410 Cutting Coolant	Order No: 01.07.857
Fixture	Horizontal push fixture	
Cutting Method	Veritcal clamp (Z axis)	
Cutting Parameters	Feed speed	0.25mm/s
	Pulse setting	Disabled
	Cutting disc speed	2000rpm

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FlexPRESS Automated Modular Hot Mounting Machine

Hot Mounting

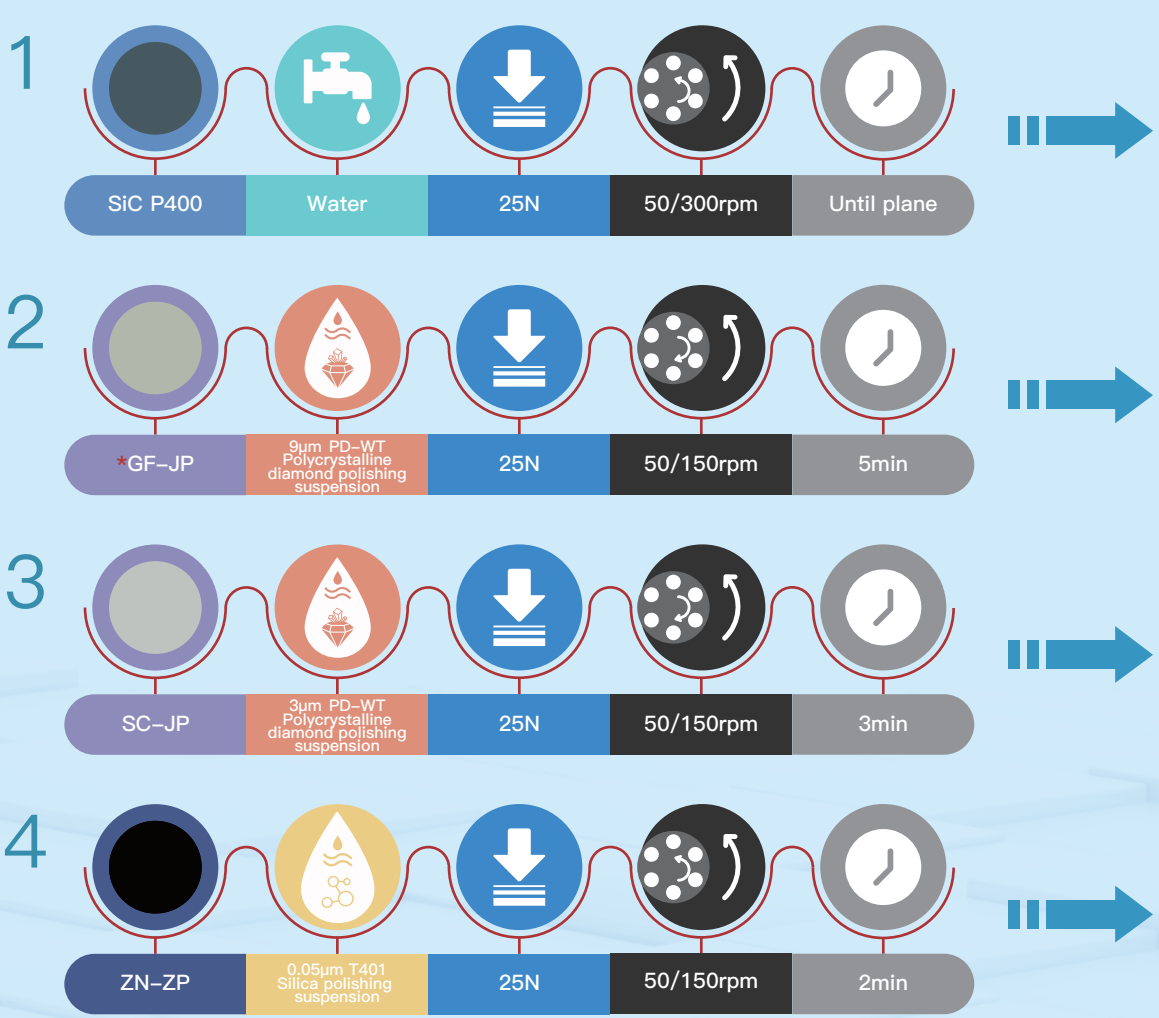
Equipment	FlexPRESS Automated Modular Hot Mounting Machine
Hot mounting resin	PT 2231 Hot Mounting Resin　　Order No：02.01.310
Heating Power	100%
Holding time	5min
Temperature	160℃
Pressure	150bar
Cooling Conditions	Cool to 40℃
Cooling rate	High
Top heating	Enabled

Basic Guide

- **Cutting**
  1.Use an A30 alumina abrasive cutting wheel for industrial pure iron. Refer to the Trojan Cutting Guide for specific models.
  2.Select non–pulse mode for cutting, with a recommended maximum cutting speed ⩽0.25 mm/s.
- **Mounting**
  Use either hot or cold mounting resin, with a preference for hot mounting.
- **Grinding**
  1.Begin with P400 silicon carbide sandpaper until the sample surface is flat and cutting damage is fully removed.
  2.Continue fine grinding with GF White Synthetin Silk Polishing Cloth + 9 μm PD–WT polycrystalline diamond polishing suspension.
  3.Clean the sample, sample holder, and hands after each grinding step.
- **Polishing**
  1.Clean the polishing cloth, sample holder, and hands before polishing. Repeat cleaning after each step.
  2.Do not mix polishing disks with different abrasive particle sizes.
  3.Rinse the sample surface with alcohol and dry with a blower to remove water residue.
  4.After each polishing step, inspect under a metallographic microscope to ensure scratch size matches the abrasive grit and direction is random.
  5.Clean polishing cloths with running water and a soft brush after use, then air–dry.
  6.Dedicate polishing cloths used for pure iron exclusively to iron samples.

Preparation Procedure——Industrial Pure Iron 50-150HV

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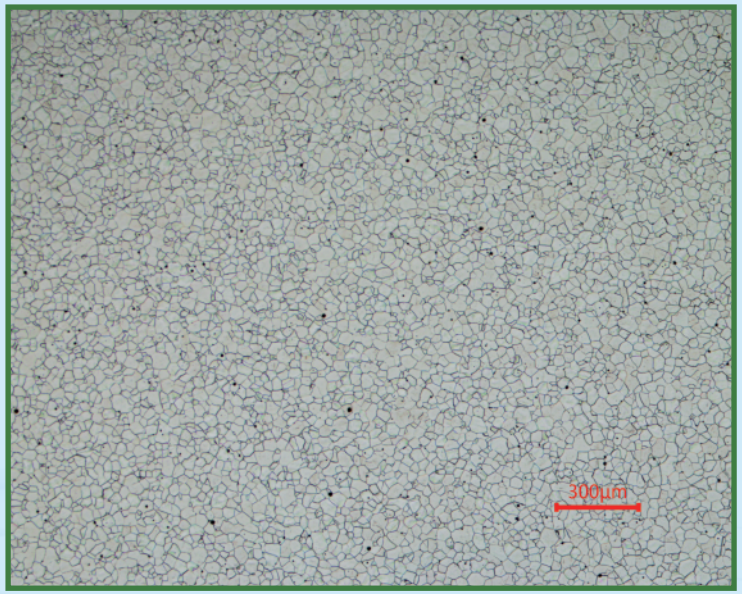
*GF-JP white synthetic silk polishing cloth can be replaced with POS discs or P800, P1500, P2000 sandpaper.

Immerse in 4% nitric acid alcohol solution for 10—60 seconds.

Industrial Pure Iron 50-150HV-Polishing Defect Sample

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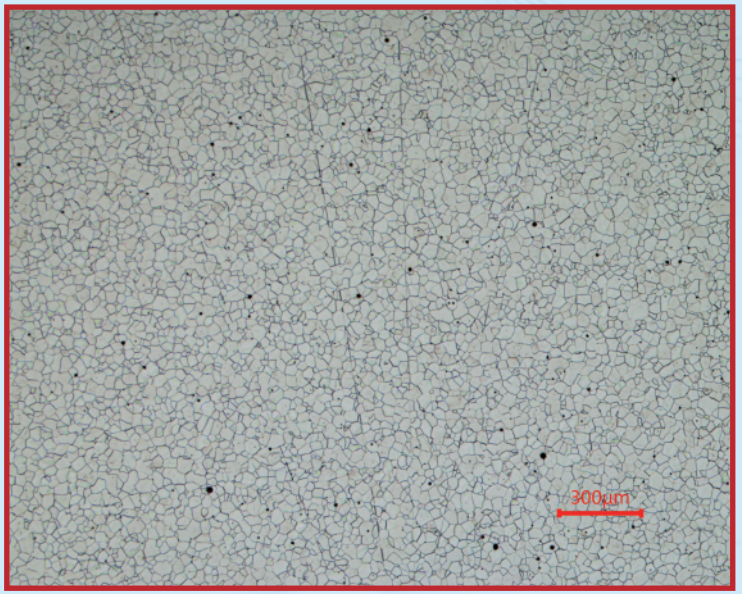
Photos of qualified polished samples



Micrograph after etching (50X magnification)

- Clear structure with a clean, scratch-free surface.

Photos of unqualified polished samples



Micrograph after etching (50X magnification)

- ZN Low-napped black polyurethane polishing cloth contamination;
- Repeat SC Blue Synthetin Silk Polishing Cloth and ZN Black Polyurethane Polishing Cloth polishing steps, then re-etch.