7050 Aluminum Alloy

TROJAN
Discover the Truth of Material

Purpose:

Observe the microstructure of aluminum alloy.
Aluminum alloys are widely used in aerospace, automotive, construction, and household industries due to their lightweight properties, high specific strength, corrosion resistance, and aesthetic appeal.
As aluminum purity increases, its hardness decreases, making it more prone to mechanical deformation and scratches. In high-purity aluminum, grinding may cause severe deformation or abrasive embedding, posing significant challenges during sample preparation. Samples undergo cutting (TableCUT-200), cold mounting (TJ-2568), grinding/polishing (Alpha-610), and etching with Keller's reagent to observe the microstructure (MN80).

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).

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

Cutting

Equipment	TableCUT-200 manual/automated precision cutting machine	
Cutting disc	S20 Silicon Carbide Cutting wheel	Order No: 01.02.422
Cutting coolant	TJ 1410 metallographic cutting coolant	Order No: 01.07.857
Fixture	Horizontal push fixture	
Cutting method	Horizontal cutting (Y-axis)	
Cutting Parameters	Feed rate	0.1mm/s
	Pulse setting	No pulse cutting
	Speed of cutting disc	3000rpm



TableCUT-200 manual/automated precision cutting machine

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ThetaMount pressure cold mounting machine

Cold Mounting

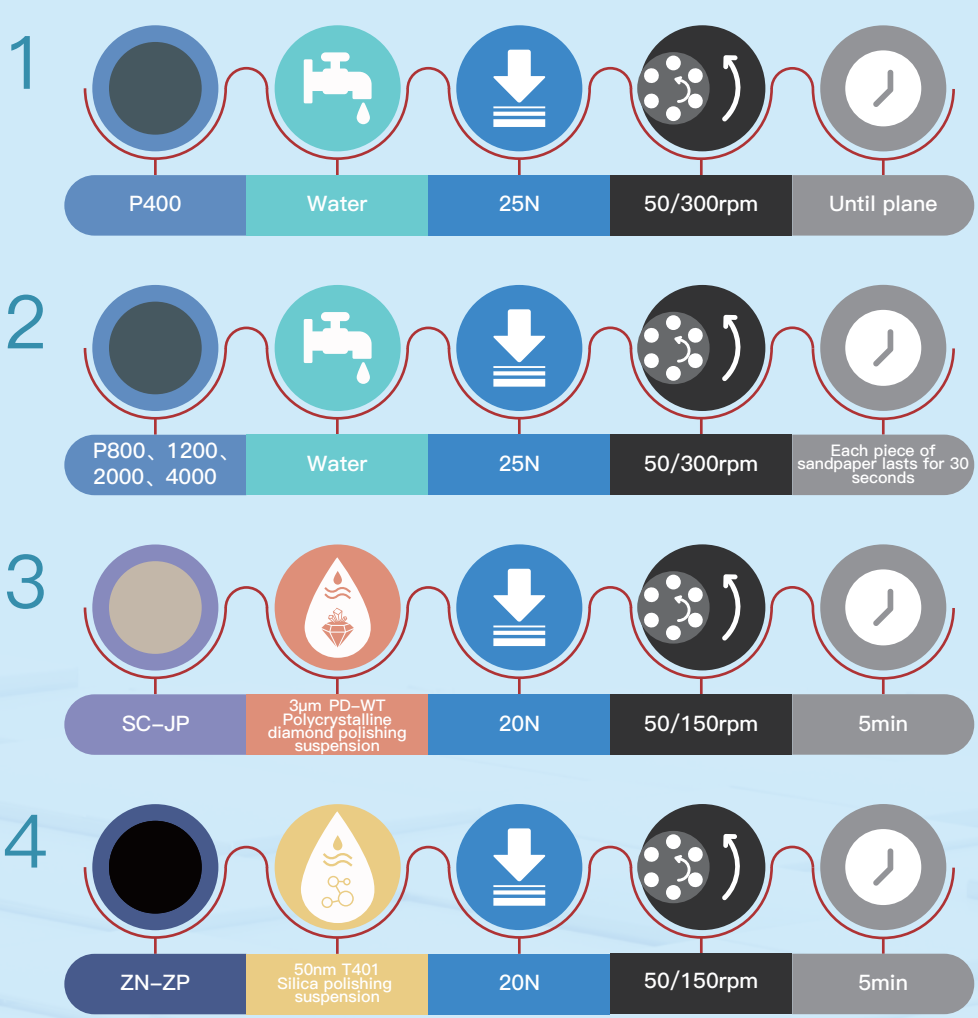
Equipment	ThetaMount pressure cold mounting machine	
Cold mounting resin	TJ 2568 epoxy resin(4.5:1)	A：Order No：02.04.855
		B：Order No：02.04.856
Mix ratio	A：B=4.5:1	
Curing time	45–90min	

Basic Guide

- **Cutting**
  1.Use a resin–bonded silicon carbide cutting wheel for aluminum alloys. Refer to the Trojan Cutting Guide for specific models.
  2.Select pulse mode for cutting, with a recommended maximum cutting speed ⩽0.25 mm/s.
- **Mounting**
  Use cold–curing resin with high edge retention.
- **Grinding**
  1.Begin with P400 silicon carbide sandpaper/lapping films until the sample surface is flat and cutting damage is fully removed.
  2.Continue grinding with P800, P1200, P2000 and P4000 sandpaper.
  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 cloths 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 aluminum alloys exclusively to such samples.

Preparation Procedure——7050 Aluminum Alloy

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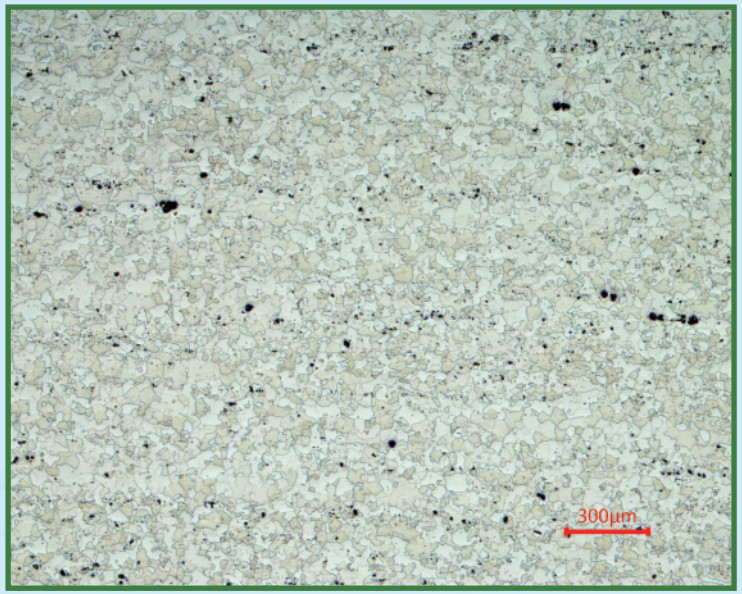


Immerse in Keller's reagent for 10—30 seconds.

7050 Aluminum Alloy-Polishing Defect Sample

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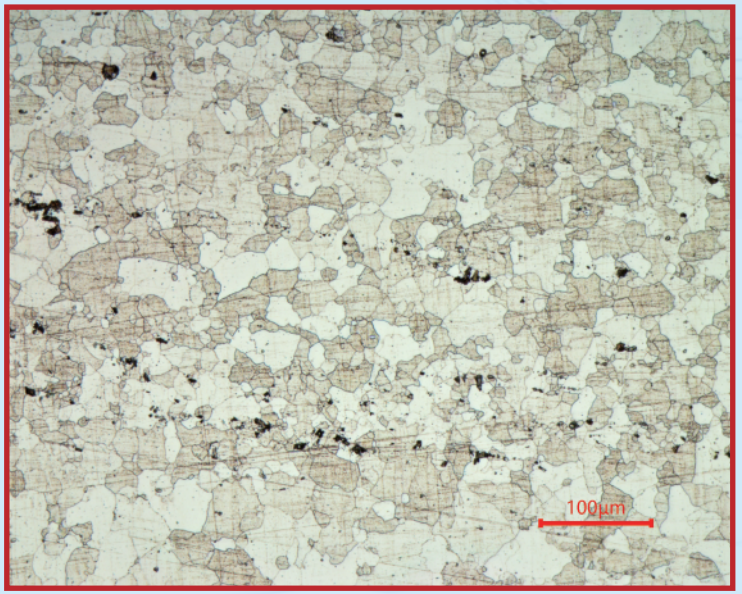
Photos of qualified polished samples



Micrograph after Keller's reagent etching (50X magnification)

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

Photos of unqualified polished samples



Micrograph after Keller's reagent etching (200X magnification)

- Residual polishing scratches observed;
- Solution: Thoroughly clean the ZN black polyurethane polishing cloth with running water and a soft brush, then re-polish using ZN black polyurethane polishing cloth + 50nm T401 silica polishing suspension.