Martensitic Steel

TROJAN
Discover the Truth of Material

Purpose:

The martensitic steel specimen is prepared by sectioning using the TableCUT–200 Automatic Precision Cut–Off Machine, hot mounting with the FlexPress automatic mounting machine, and grinding and polishing using the ALPHA 610 automatic grinding and polishing machine. After etching, the microstructure of the specimen is exam–ined under an optical microscope.

Recommended Equipment and Consumables(Grinding and polishing consumables should be selected according to the actual sample condition.)



TableCUT–200 Automatic Precision Cut–Off Machine

Force Recommendation by Specimen Size				
Sample size/ diameter (mm)	25	30	40	50
Individual loading mode, Force per Specimen (N)	–5	0	+(5~10)	+(5~10)

*Based on a standard specimen diameter of Ø30 mm, the applied force should beadjusted according to the actual specimen size.

Cutting

Equipment	TableCUT–200 Automatic Precision Cut–Off Machine	
Cutting disc	A 60 Alumina Abrasive Wheels	Order No：01.01.118
Cutting coolant	TJ 1410 cutting coolant	Order No：01.07.857
Fixture	Small Fast and quick clamping & Small Vertical Clamping	
Cutting method	Horizontal Cutting (Y–Axis)	
Cutting parameters	Feeding speed	0.2mm/s
	Pulse Settings	Pulse Cutting
	Speed	3000rpm

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FlexPRESS Mounting Press

Hot mounting

Equipment	FlexPRESS Mounting Press	
Hot mounting resin	EP 2237 Edge Retention Mounting Resin	Order No：02.01.710
Heating power	100%	
Holding time	5min	
Temperature	180℃	
Pressure	180bar	
Target Temperature	Cool down to 40℃	
Cooling rate	Fast	
Top Heating	Enabled	

Basic Preparation Guide

- **Cutting**
  1. For martensitic steel, select an A60 aluminum oxide cutting wheel.The specific wheel specification should be selected according to the Trojan Cutting Guide.
  2.Use pulse cutting mode for sectioning. The recommended maximum cutting speed is ⩽ 0.25 mm/s.
- **Mounting**
  For the observation of the internal microstructure, either a high edge–re–tention hot mounting compound or a cold mounting resin may be used.
- **Grinding**
  1.Start grinding with SiC paper beginning at P400, and grind until the specimen surface is flat and the cutting damage layer is completely removed.
  2.Continue grinding using a POS disc in combination with 9µm polycrystalline diamond suspension.
  3.After each grinding step, thoroughly clean the specimen, specimen holder, and hands to prevent contamination.
- **Polishing**
  1.Before starting polishing, the polishing cloth, specimen holder, and hands must be thoroughly cleaned. This cleaning procedure shall be repeated after each subsequent polishing step.
  2.Polishing discs used with different abrasive particle sizes must not be mixed.
  3.After polishing, rinse the specimen with alcohol and dry the surface using a blower to remove residual water stains and prevent corrosion.
  4.After each polishing step, examine the specimen under a metallurgical microscope to verify that the scratch size corresponds to the polishing particle size and that the scratches are randomly oriented.
  5.After use, polishing cloths should be cleaned with running water and a soft brush, drained, and stored properly.

Preparation Procedure——Martensitic Steel

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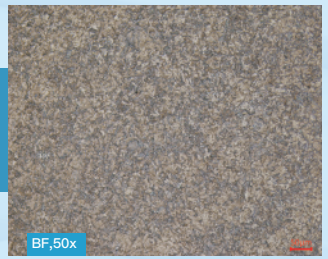
1	SiC abrasive paper P400	Water	30N	50/200rpm	Until plane
2	**POS disc	9μm PD-WT Polycrystalline Diamond Suspension	30N	50/200rpm	5min
3	SC-JP	3μm PD-WT Polycrystalline Diamond Suspension	25N	80/150rpm	3min
4	ZN-ZP	A439 Colloidal Silica Suspension	25N	80/150rpm	2min (Rinse with water during the final 15 s)











*The POS disc may be replaced with P800, P2000, or P2500 SiC paper.

Ferric chloride—hydrochloric acid aqueous solution, 10—20s

Polishing Quality Examples-Martensitic Steel

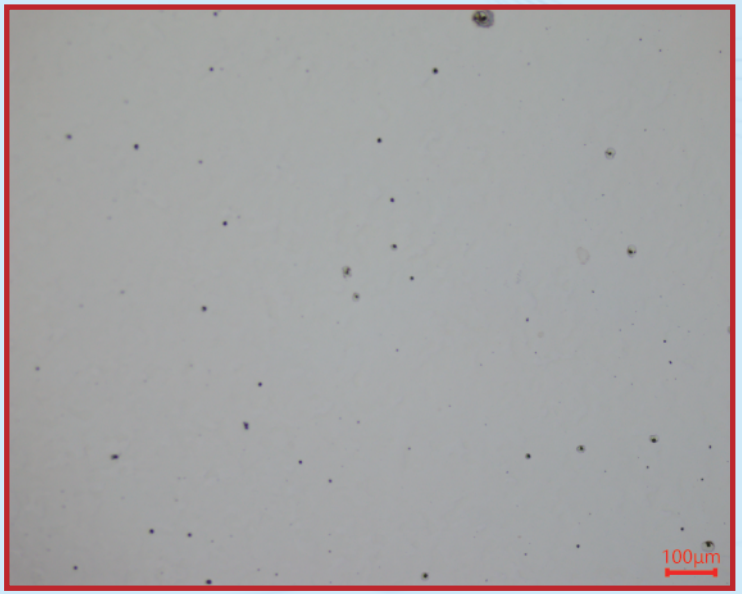
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Acceptable Polishing Result



- The specimen surface is clean and free of scratches.

Unacceptable Polishing Result



- Cause: Coarse foreign particles remain on the specimen surface due to insufficient cleaning.
- Solution: Thoroughly clean the specimen, specimen holder, polishing cloth, and hands, then repeat the polishing steps using the SC polishing cloth with 3µm diamond suspension and the ZN polishing cloth.