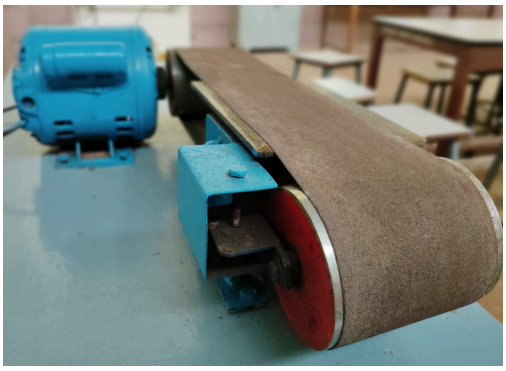
Equipment

Photo	Specification
 **8 Trinocular Optical Metallurgical Microscope**	This high-precision microscope is designed for detailed analysis of material microstructures. It features a trinocular head for optical clarity and allows for capturing images or video, making it an essential tool for metallurgical investigations. **Specifications:** **Make**: S.M. Engineers, Pune **Main Supply**: 220 volts A.C. **Transformer**: 6 volts, 20 watts **Eye Piece Magnification**: 10x, 15x **Objective Magnification**: M5x, M10x, M40x, M100x
 **9. Muffle Furnace 1**	

10. Muffle Furnace 2

The Muffle Furnace is used for high-temperature applications such as heat treatment and material testing. With a microprocessor-based digital controller, it offers precise temperature control, reaching up to 1150°C, making it ideal for metallurgical processes.

Specification:
Make: DTI
Size of Furnace (L x W x H): 22" x 18" x 20"
Heating Area (L x W x H): 6" x 6" x 12"
Maximum Temperature: 1150°C
Temperature Controller: Microprocessor-based P.I.D. digital temperature controller
Temperature Display: Dual display (set point & process temperature)
Mains Supply: Single-phase



11. Belt Grinder

The Belt Grinder is a versatile machine used for surface finishing and material removal. Powered by a ¼ HP motor, it offers efficient grinding with a compact belt size, making it ideal for precision work in metallurgical labs.

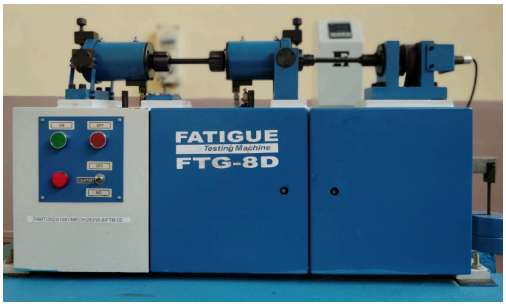
Specifications:
Make: S. M. Engineer
Model: BDA52C42686
Motor: ¼ HP, 1425 RPM
Belt Size: 100 x 95 mm
Grinding Area: 100 x 150 mm

12. Disc Polishing Machine

A disc polishing machine is designed for surface finishing of various materials by using abrasive cloth or paper discs. It is equipped with a powerful motor that ensures smooth, high-speed operation, making it suitable for both industrial and laboratory applications.

Specifications:
Make: S.S.P. Enterprise
Diameter of the Disc (cloth): 8 inches
Diameter of the Disc (papers): 8 inches
Motor: Crompton & Greaves

- **Speed**: 1425 RPM
- **Power**: 0.25 HP
- **Phase**: Single Phase



13.Fatigue Testing Machine

A fatigue testing machine is used to determine the durability and performance of materials under cyclic loading. This machine is essential for assessing the fatigue strength of materials by applying a constant bending moment under controlled conditions.

Specifications:
Make: FINE MANUFACTURING INDUSTRIES
Model: BDA52C42686
Maximum Bending Moment: 400 Kg-cm
Load (Adjustable): 5 – 80 kg
Range 1: 100 Kg-cm
Range 2: 200 Kg-cm
Range 3: 300 Kg-cm
Range 4: 400 Kg-cm
Gripping Diameter of Test Specimen: 12 mm
Testing Diameter of Test Specimen: 8 mm
Length of Test Specimen: 226 mm
Rotating Speed of Specimen: 4200 RPM
Accuracy of Applied Load: ±1%
Revolution Counter:

- **Mechanical**:
  - Number of Digits: 7
  - Multiplying Factor: 3
- **Electronic (optional)**:
  - Number of Digits: 8
  - Multiplying Factor: 1

Motor: 3-Phase, 0.5 HP, 2800 RPM
Mains Supply: 3-Phase, 440 Volts, 50 Hz, AC
Overall Size: 1000 L x 500 W x 600 H mm
Weight (Approx.): 120 kg

14. End Quench Test Apparatus

The end quench test apparatus is designed to measure the hardenability of steel specimens by quenching them in water. The apparatus uses a self-priming pump to deliver a controlled water flow, ensuring accurate testing of material properties.

Specifications:
Model: FEQ-25
Motor & Pump:

- Q-tech Centrifugal Regenerative Self-Priming Pump
- Model: SP 01
- Power: 0.12 KW / 0.166 HP
- Single Phase- AC, 240 volts
- Speed: 2700 RPM
- Head Range: 9 - 15 meters

Test Specimen Dimensions: Dia. 25 mm x Length 100 mm
Inside Diameter of Water Supply Pipe: 12.5 mm
Height of Free Water Jet: 65 mm
Distance from Nozzle Tip to Test Piece Bottom: 12.5 mm
Power Supply: 1 Phase, 230V, 50Hz, AC

List of experiments

- Study of Characterization techniques and Metallographic sample preparation and etching.
- Comparison of microstructures and hardness of a steel specimen before and after heat treatments (Annealing, Normalizing and Hardening).
- Comparison of microstructures and hardness of a steel specimen before and after heat treatments (Annealing, Normalizing and Hardening).
- Determination of hardenability of steel using Jominy End Quench Test.
- Determine the number of cycles to failure of a given material at a given stress by performing fatigue test.