Instrumentation & Equipment

(Engineering)

Aiken
UNIVERSITY OF SOUTH CAROLINA

Index

Jet Shear/Brake and Roll Machine SBR-40M

Description:

The Jet Shear/Brake and Roll Machine SBR-40M is a versatile 3-in-1 machine designed for sheet metal fabrication. It combines shearing, bending, and rolling capabilities into a single, compact unit, making it ideal for small shops and hobbyists.

Details and Capabilities:

- **Shear:** Capable of cutting sheet metal up to 20-gauge thickness
- **Brake:** Provides bending capabilities up to 90 degrees
- **Roll:** Can roll metal into cylindrical shapes with a maximum thickness of 20 gauge
- Adjustable depth stops for precise bending and shearing
- Heavy-duty construction for durability and longevity
- Manual operation with easy-to-use controls
- **Applications:** Used in metalworking for creating custom metal parts and components.
- **Advantages:** Offers three functions in one machine, saving space and increasing efficiency in metal fabrication.

Applications:

- **Metal Fabrication:** Ideal for creating brackets, enclosures, and custom metal parts.
- **Prototyping:** Suitable for small-scale production and prototyping of metal components.

Jet Disc 230/460V 1.5 HP Belt/Disc Bench Grinder

Description:

The Jet Disc 230/460V 1.5 HP Belt/Disc Bench Grinder is a powerful tool used for grinding, sanding, and finishing metal and wood surfaces. It combines a belt sander and disc grinder into one unit for versatile use.

Details and Capabilities:

- **Motor:** 1.5 HP motor with dual voltage (230/460V) capability
- 12-inch disc and 6x48-inch belt for various grinding applications
- Heavy-duty base for stability and reduced vibration
- Adjustable belt and disc tables for precise angle grinding
- **Applications:** Used in metalworking, woodworking, and fabrication for surface preparation and finishing.
- **Advantages:** Offers versatility and power for a range of grinding and sanding tasks.

Applications:

- **Metal and Wood Finishing:** Smooths rough edges and surfaces for a polished finish.
- **Deburring and Surface Prep:** Prepares metal parts for welding and painting by removing burrs and imperfections.

WAZER Desktop

CNC Waterjet Cutter

Description:

The WAZER Desktop CNC Waterjet Cutter is a compact and affordable waterjet cutting system designed for precision cutting of various materials, including metal, glass, and stone. It utilizes high-pressure water and abrasive particles to cut intricate shapes with ease.

Details and Capabilities:

- **Power Supply:** 110V / 60Hz for North American use
- **Cutting Capacity:** Capable of cutting materials up to 3/8 inch thick
- Desktop-sized for easy integration into small workshops
- User-friendly software for precise control and design import
- Closed-loop water system for minimal waste and maintenance
- **Applications:** Used in prototyping, custom fabrication, and educational settings for precision cutting of complex shapes.
- **Advantages:** Provides precise and versatile cutting capabilities in a compact form factor, suitable for small workshops and educational institutions.

Applications:

- **Prototyping:** Ideal for creating intricate parts and components for prototypes.
- **Custom Fabrication:** Supports custom cutting of various materials for artistic and industrial applications.

BA9-1016618 Baileigh Metal Lathe PL-1340E

Description:

The Baileigh Metal Lathe PL-1340E is a precision-engineered lathe designed for turning metal parts with accuracy and efficiency. It is equipped with features that cater to both professional machinists and hobbyists.

Details and Capabilities:

- **Swing Over Bed:** 13 inches
- Distance Between Centers: 40 inches
- Gearhead design for easy speed changes
- Precision ground bedways for smooth operation
- Digital readout for accurate measurements
- **Applications:** Used in metalworking and manufacturing for turning, threading, and facing operations.
- **Advantages:** Provides a robust and reliable platform for precision machining of metal parts.

Applications:

- **Turning and Facing:** Produces precise cylindrical parts and surfaces.
- **Threading:** Creates accurate threads on metal rods and shafts.

Baileigh Variable Speed Vertical Mill

Description:

The Baileigh VM-1054E-VS Variable Speed Vertical Mill is a versatile milling machine designed for precision machining of metal and other materials. It features variable speed control for optimal performance and flexibility.

Details and Capabilities:

- **Table Size:** 10 x 54 inches
- **Spindle Speed:** Variable speed from 60 to 4,200 RPM
- R8 spindle for compatibility with a wide range of tooling
- Digital readout for precise control and measurements
- Heavy-duty construction for stability and durability
- **Applications:** Used in metalworking, manufacturing, and prototyping for milling, drilling, and tapping operations.
- **Advantages:** Offers versatility and precision in a compact design, suitable for small to medium-sized workshops.

Applications:

- **Milling and Drilling:** Performs precision milling and drilling on metal parts and materials.
- **Prototyping:** Supports the creation of complex parts and components for prototypes.

TL-1-EDU TL Series

Toolroom CNC Lathe

Description:

The TL-1-EDU TL Series Toolroom CNC Lathe is a user-friendly CNC lathe designed for educational and training purposes. It combines traditional lathe operations with CNC capabilities, providing a versatile platform for learning and production.

Details and Capabilities:

- **Swing Over Bed:** 16 inches
- **Distance Between Centers:** 30 inches
- CNC control with intuitive interface for easy operation
- Manual and automatic modes for versatility
- Rigid construction for precision and accuracy
- **Applications:** Used in educational institutions and workshops for training, prototyping, and small-scale production.
- **Advantages:** Offers an ideal platform for learning CNC operations while maintaining traditional lathe capabilities.

Applications:

- **Educational Training:** Provides hands-on experience with CNC lathe operations for students and trainees.
- **Prototyping:** Supports the creation of precise parts and components for prototypes.

Free and Forced Vibrations Machine Model

Description:

The Free and Forced Vibrations Machine Model # TM1016V is an educational tool used to study the principles of mechanical vibrations. It demonstrates free and forced vibrations in mechanical systems, aiding in the understanding of dynamic behavior.

Details and Capabilities:

- **Measurement Range:** Adjustable parameters for different vibration modes
- Modular design for easy setup and operation
- Includes sensors and data acquisition for detailed analysis
- Visual and quantitative demonstration of vibration phenomena
- **Applications:** Used in educational and research settings to study vibration theory and dynamics.
- **Advantages:** Provides a hands-on approach to understanding mechanical vibrations, essential for engineering education and research.

Applications:

- **Vibration Analysis:** Demonstrates the effects of free and forced vibrations on mechanical systems.
- **Educational Demonstrations:** Supports teaching and learning of vibration principles and dynamics.

Model 34FM-100 Floor Model Universal Tester

Description:

The Model 34FM-100 Floor Model Universal Tester is a robust testing machine designed for evaluating the mechanical properties of materials under tensile, compressive, and flexural loads. It offers precise control and measurement for accurate material testing.

Details and Capabilities:

- **Capacity:** 100 kN (22,500 lbf)
- High-precision load cell for accurate force measurements
- Digital control and data acquisition for detailed analysis
- Versatile fixtures for various testing configurations
- **Applications:** Used in materials science, engineering, and quality control for testing the mechanical properties of materials and components.
- **Advantages:** Provides reliable and accurate material testing capabilities, essential for research and quality assurance.

Applications:

- **Tensile Testing:** Evaluates the tensile strength and elongation of materials.
- **Compressive Testing:** Assesses the compressive strength and deformation characteristics of materials.

Fusion Maker-12 Epilog

Laser Fusion Pro 48

Description:

The Fusion Maker-12 Epilog Laser Fusion Pro 48 is a state-of-the-art laser engraving and cutting machine designed for precision work on a variety of materials. It combines advanced laser technology with user-friendly controls for optimal performance.

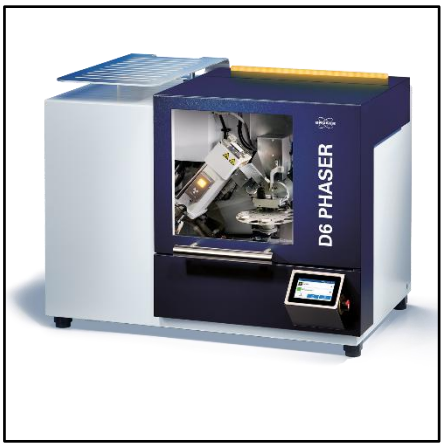
Details and Capabilities:

- **Laser Type:** CO2 laser with adjustable power output
- **Work Area:** 48 x 36 inches
- High-speed engraving and cutting with precision control
- Intuitive software for design import and operation
- Robust construction for reliable performance and longevity
- **Applications:** Used in fabrication, design, and prototyping for laser engraving, cutting, and marking on materials such as wood, acrylic, and metal.
- **Advantages:** Offers versatile and precise laser processing capabilities, suitable for a wide range of applications in design and manufacturing.

Applications:

- **Laser Engraving:** Creates detailed engravings and markings on various materials for artistic and industrial purposes.
- **Laser Cutting:** Supports precision cutting of intricate shapes and designs for prototyping and production

FX-Ray Diffractometer – Bruker D6 Phaser



Description:

The Bruker D6 Phaser is a compact, benchtop X-ray diffractometer designed for rapid and precise material characterization. It is ideal for research and academic environments requiring high-performance diffraction analysis with minimal footprint.

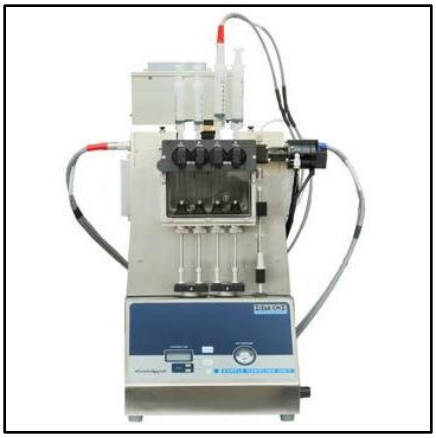
Details and Capabilities:

- Equipped with a 600 W copper X-ray source for enhanced resolution and intensity.
- Features dynamic beam optimization for efficient data collection.
- Utilizes an SSD160-2 silicon strip detector for high-precision results.
- Angular Range: –3° to 152° 2θ
- Angular Accuracy: ±0.01° 2θ
- Includes a Variable Temperature Stage: Operates from 25°C to 500°C
- **12-position sample changer:**
  - Air-tight mounting capability for sensitive samples.
  - Accepts both 28 x 3 mm and 25 x 1 mm specimen wells.
- Compact benchtop design suited for labs with limited space.

Applications:

- **Materials Science:** Crystallographic phase identification and quantification.
- **Chemistry:** Monitoring of compound purity and structural integrity.
- **Engineering:** Analysis of thin films, metals, and powders.

Stopped-Flow Spectrometer KinetAsyst



Description:

The KinetAsyst Stopped-Flow Spectrometer is a high performance system designed for fast kinetic measurements in solution. It enables rapid mixing and real-time monitoring of transient chemical reactions.

Details and Capabilities:

- Configurable with single or dual mixing systems.
- Dual detection channels for simultaneous multi-wavelength monitoring.
- Precision flow and mixing technology for reactions occurring in milliseconds.
- Compact modular design for flexible setup in laboratory environments.
- Easy data acquisition and control through integrated software.
- Supports absorbance and fluorescence detection modes.

Applications:

- Biochemistry: Protein-ligand interaction studies.
- Physical Chemistry: Fast reaction mechanism analysis.
- Pharmaceutical Research: Drug-target binding kinetics.

Differential Scanning Calorimeter – TA Instruments DSC2500

Description:

The TA Instruments DSC2500 is a precision modulated temperature differential scanning calorimeter (MT-DSC) used for advanced thermal analysis. It is engineered to deliver the most accurate heat flow measurements using proprietary Tzero® technology.

Details and Capabilities:

- Modulated Temperature DSC (MT-DSC) for complex thermal behavior analysis.
- Tzero® Heat Flow Measurement ensures superior sensitivity and baseline stability.
- Wide temperature range with capability for heating, cooling, and pseudo-isothermal experiments.
- Operates in pseudo-isothermal mode with temperature modulation for dynamic analysis.
- Advanced automation and data handling software for thermal transitions and kinetics.

Applications:

- Materials Science: Glass transition, melting, and crystallization studies.
- Polymers: Thermal stability, curing behavior, and cross-linking kinetics.
- Pharmaceuticals: Purity analysis, polymorph detection, and stability testing.