

Volume 16  
**Machining**

**1. Introduction to Machining Processes**

**2. Fundamentals of the Machining Process**

Mechanics of Chip Formation  
Forces, Power, and Stresses in Machining  
Surface Finish and Surface Integrity  
Tool Wear and Tool Life

**3. Cutting Tool Materials**

High-Speed Tool Steels  
P/M High-Speed Tool Steels  
Cast Cobalt Alloys  
Cemented Carbides  
Cermets  
Ceramics  
Ultrahard Tool Materials

**4. Cutting Fluids**

Metal Cutting and Grinding Fluids

**5. Traditional Machining Processes**

Turning  
Boring  
Trepanning  
Planing  
Shaping and Slotting  
Broaching  
Drilling  
Reaming  
Countersinking, Counterboring, and Spotfacing  
Roller Burnishing  
Tapping  
Thread Milling  
Thread Grinding  
Thread Rolling

- Die Threading
- Milling
- Gear Manufacture
- Sawing
- Multiple-Operation Machining
- Proper Fixturing
- Tool Condition Monitoring Systems

## **6. Grinding, Honing, and Lapping**

- Principles of Grinding
- Grinding Equipment and Processes
- Superabrasives
- Honing
- Lapping

## **7. Nontraditional Machining Processes**

- Introduction to Nontraditional Machining Processes
- Abrasive Jet Machining
- Abrasive Flow Machining
- Waterjet/Abrasive Waterjet Machining
- Ultrasonic Machining
- Electrochemical Machining
- Electrochemical Grinding
- Electrochemical Discharge Grinding
- Electrostream and Capillary Drilling
- Shaped Tube Electrolytic Machining
- Electrical Discharge Machining
- Electrical Discharge Grinding
- Electron Beam Machining
- Laser Beam Machining
- Thermal Energy Method
- Chemical Milling
- Photochemical Machining

## **8. High-Productivity Machining**

- High-Speed Machining
- High Removal Rate Machining

## **9. Machine Controls and Computer Applications in Machining**

Numerical Control

Adaptive Control

CAD/CAM Applications in Machining

## **10. Machining of Specific Metals and Alloys**

Machinability Test Methods

Machining of Cast Irons

Machining of Carbon and Alloy Steels

Machining of Stainless Steels

Machining of Tool Steels

Machining of P/M Tool Steels

Machining of Heat-Resistant Alloys

Machining of Aluminum and Aluminum Alloys

Machining of Copper and Copper Alloys

Machining of Magnesium and Magnesium Alloys

Machining of Zinc Alloy Die Castings

Machining of Nickel and Nickel Alloys

Machining of Reactive Metals

Machining of Refractory Metals

Machining of Beryllium

Machining of Uranium and Uranium Alloys

Machining of Powder Metallurgy Materials

Machining of Metal-Matrix Composites and Honeycomb Structures