

Volume 14

Forming and Forging

1. Introduction to Forming and Forging Processes

2. Forging Equipment and Dies

- Hammers and Presses for Forging
- Selection of Forging Equipment
- Dies and Die Materials for Hot Forging

3. Forging Processes

- Open-Die Forging
- Closed-Die Forging in Hammers and Presses
- Hot Upset Forging
- Roll Forging
- High-Energy-Rate Forging
- Ring Rolling
- Rotary Swaging of Bars and Tubes
- Radial Forging
- Isothermal and Hot-Die Forging
- Precision Forging
- Rotary Forging
- Coining
- Powder Forging

4. Forging of Carbon, Alloy, and Stainless Steels and Heat-Resistant Alloys

- Forging of Carbon and Alloy Steels
- Forging of Stainless Steel
- Forging of Heat-Resistant Alloys
- Forging of Refractory Metals

5. Forging of Nonferrous Metals

- Forging of Aluminum Alloys
- Forging of Copper and Copper Alloys
- Forging of Magnesium Alloys

Forging of Nickel-Base Alloys
Forging of Titanium Alloys

6. Cold Heading and Cold Extrusion

Cold Heading
Cold Extrusion

7. Other Bulk Forming Processes

Conventional Hot Extrusion
Hydrostatic Extrusion
Wire, Rod, and Tube Drawing
Flat, Bar, and Shape Rolling

8. Evaluation of Workability

Introduction to Workability
Workability Tests
Workability Theory and Application in Bulk Forming Processes

9. Computer-Aided Process Design for Bulk Forming

Introduction to Process Design for Bulk Forming
Forging Process Design
Modeling Techniques Used in Forging Process Design
Acquisition of Data for Forging Process Design

10. Blanking and Piercing of Steel Sheet, Strip, and Plate

Blanking of Low-Carbon Steel
Piercing of Low-Carbon Steel
Fine-Edge Blanking and Piercing
Blanking and Piercing of Electrical Steel Sheet
Selection of Material for Blanking and Piercing Dies

11. Tooling and Lubrication for Forming of Sheet, Strip, and Plate

Presses and Auxiliary Equipment for Forming of Sheet Metal
Selection of Material for Press-Forming Dies
Selection of Material for Deep-Drawing Dies
Selection and Use of Lubricants in Forming of Sheet Metal

12. Forming Processes for Sheet, Strip, and Plate

- Press Bending of Low-Carbon Steel
- Press-Brake Forming
- Press Forming of Low-Carbon Steel
- Press Forming of High-Carbon Steel
- Press Forming of Coated Steel
- Forming of Steel Strip in Multiple-Slide Machines
- Deep Drawing
- Stretch Forming
- Spinning
- Rubber-Pad Forming
- Three-Roll Forming
- Contour Roll Forming
- Explosive Forming
- Electromagnetic Forming
- Drop Hammer Forming

13. Forming of Bar, Tube, and Wire

- Bending of Bars and Bar Sections
 - Bending and Forming of Tubing
 - Tube Spinning
- Straightening of Bars, Shapes, and Long Parts
- Straightening of Tubing
- Forming of Wire

14. Shearing, Slitting, and Cutting

- Shearing of Plate and Flat Sheet
- Slitting and Shearing of Coiled Sheet and Strip
- Shearing of Bars and Bar Sections
- Thermal Cutting
- Laser Cutting
- Abrasive Water jet Cutting

15. Forming of Stainless Steel and Heat-Resistant Alloy Sheet Materials

- Forming of Stainless Steel
- Forming of Heat-Resistant Alloys
- Forming of Refractory Metals

16. Forming of Nonferrous Sheet Materials

- Forming of Aluminum Alloys
- Forming of Beryllium
- Forming of Copper and Copper Alloys
- Forming of Magnesium Alloys
- Forming of Nickel-Base Alloys
- Forming of Titanium and Titanium Alloys
- Working of Platinum Group Metals
- Super plastic Sheet Forming

17. Evaluation of Formability for Secondary (Sheet)

Forming

- Formability Testing of Sheet Metals

18. Process Design for Sheet Forming

- CAD/CAM Applications in Sheet Forming
- Process Modeling and Simulation for Sheet Forming
- Statistical Analysis of Forming Processes