
H HANDBOOK OF UTILITIES AND SERVICES FOR BUILDINGS

PLANNING, DESIGN,
AND INSTALLATION

CYRIL M. HARRIS

CONTENTS

Preface ix

PART 1 WATER SUPPLY SERVICES

- 1. Water Quality and Treatment** 1.3
Peter S. Cartwright, P.E., *Consulting Engineer, Cartwright Consulting Co., Minneapolis, MN 55425*
- 2. Water Supply Requirements in Buildings** 2.1
Louis S. Nielsen, P.E., *Consulting Engineer, Fresh Meadows, NY 11365*
- 3. Water Distribution Systems in Buildings** 3.1
Theodore Musialowski, C.I.P.E., *Project Manager, Store, Matakovich & Wolfberg, Mechanical and Electrical Consulting Engineers, El Monte, CA 91734*
- 4. Water Pressure in Domestic Water Distribution Systems** 4.1
Michael Frankel, C.I.P.E., *Engineer, The Jacobs Engineering Group, Mountainside, NJ 07092*
AND
Jonathan D. Earle, *Senior Plumbing Designer, Lockwood Greene, Engineers, New York, NY 10001*
- 5. Plumbing Fixtures and Fittings** 5.1
Louis S. Nielsen, P.E., *Consulting Engineer, Fresh Meadows, NY 11365*
- 6. Water Pumps** 6.1
John H. Doolin, P.E., *Director, Technology, Dresser Pump Division, Dresser Industries, Mountainside, NJ 07092*
- 7. Sizing a Water Supply System** 7.1
Louis S. Nielsen, P.E., *Consulting Engineer, Fresh Meadows, NY 11365*
- 8. Piping Insulation** 8.1
Winfield T. Irwin, *Manager, Technical Services, CertainTeed Corporation, Valley Forge, PA 19482*
- 9. Seismic Protection** 9.1
Fred E. Jacob, C.I.P.E., *Ted Jacob Engineering Group, Inc., Oakland, CA 94610*
- 10. Specifications** 10.1
William W. Aird, P.E., *CSI, Aird Telcom Associates, Alexandria, VA 22314; Chief Engineer (Retired), The American Institute of Architects*

11. Installation of Water Systems in Buildings	11.1
George Kauffman, <i>Plumbing Contractor, George Kauffman Plumbing, Van Nuys, CA 91401</i>	
12. Testing of Plumbing Systems	12.1
Haig Demergian, P.E., <i>d'Autremont-Helms & Associates, Los Angeles, CA 90042</i>	
13. Protecting Water Supply Systems	13.1
Patrick A. Sylvester, <i>Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, Los Angeles, CA 90089</i>	
14. Hot-Water Supply Systems	14.1
Allen J. Hanley, M.Eng., <i>Consulting Engineer, Allen Hanley, Consultant, Westmount, Quebec H3Y2W5</i>	
15. Fire Sprinkler and Standpipe Systems	15.1
Russell P. Fleming, P.E., <i>Vice President of Engineering, National Fire Sprinkler Association, Patterson, NY 12363</i>	
PART 2 DRAINAGE SERVICES	
16. Sanitary Drainage Systems	16.3
Louis S. Nielsen, P.E., <i>Consulting Engineer, Fresh Meadows, NY 11365</i>	
17. Vent Systems	17.1
Louis S. Nielsen, P.E., <i>Consulting Engineer, Fresh Meadows, NY 11365</i>	
18. Drainage and Vent System Components	18.1
Michael Frankel, C.I.P.E., <i>Engineer, The Jacobs Engineering Group, Mountainside, NJ 07092</i>	
19. Storm-Water Drainage Systems	19.1
David L. Hiedeman, P.E., C.I.P.E., <i>President, L. E. Hiedeman Co. Inc., St. Louis, MO 63141</i>	
PART 3 REFUSE DISPOSAL SERVICES	
20. Introduction to Refuse Disposal Systems	20.3
Joseph F. Schulz, <i>Chairman, Van Packer Company, Beach Haven, NJ 08009</i>	
21. Gravity-Type Refuse Chutes	21.1
Edwin J. Czaplicke, <i>Retired Vice President, Wilkinson Company, Inc., Stow, OH 44224</i>	
22. Refuse Compactors	22.1
Seymour Oestreicher, <i>Director, IDC Systems, Inc., Mt. Vernon, NY 10550</i>	
PART 4 GAS SUPPLY SERVICES	
23. Gas Standards, Codes, and Code Administration	23.3
Allen C. Weidman, <i>Director, Marketing, American Gas Association, Arlington, VA 22209</i>	

24. Gas System Design	24.1
Allen C. Weidman, <i>Director, Marketing, American Gas Association, Arlington, VA 22209</i>	
25. Gas Piping Installation	25.1
Allen C. Weidman, <i>Director, Marketing, American Gas Association, Arlington, VA 22209</i>	
26. Equipment Connections to Gas Piping Systems	26.1
Allen C. Weidman, <i>Director, Marketing, American Gas Association, Arlington, VA 22209</i>	
 PART 5 ELECTRICAL SUPPLY SERVICES	
27. Introduction to Electrical Services in Buildings	27.3
Daniel L. Goldberg, P.E., <i>Professional Engineer, West New York, NJ 07093; Chief Engineer (Retired), Port Authority of New York and New Jersey</i>	
28. Electrical Service Entry	28.1
Mo-Shing Chen, P.E., <i>Energy Systems Research Center, University of Texas at Arlington, Arlington, TX 76016</i>	
AND	
Jin-Far Liu, P.E., <i>Energy Systems Research Center, University of Texas at Arlington, Arlington, TX 76016</i>	
29. Electrical Wiring	29.1
Samuel A. Bogen, P.E., <i>Consulting Engineer, Port Washington, NY 11050</i>	
30. Electrical Grounding	30.1
William J. Neiswender, P.E., <i>Consulting Engineer, Neiswender Engineering, Inc., Orlando, FL 32819</i>	
31. Electrical Power Distribution Apparatus	31.1
Daniel L. Goldberg, P.E., <i>Professional Engineer, West New York, NJ 07093; Chief Engineer (Retired), Port Authority of New York and New Jersey</i>	
32. Electrical System Design	32.1
Daniel L. Goldberg, P.E., <i>Professional Engineer, West New York, NJ 07093; Chief Engineer (Retired), Port Authority of New York and New Jersey</i>	
33. Electrical Systems and Circuit Protection	33.1
Robert L. Smith, Jr., <i>Application Engineer, General Electric Company, Albany, NY 12205</i>	
 PART 6 TELECOMMUNICATIONS SERVICES	
34. Telecommunications Systems in Buildings	34.3
T. R. Ramakrishna, <i>Member of the Technical Staff, AT&T Bell Laboratories, Holmdel, NJ 07733</i>	
35. Transmission Media, Wiring, and Associated Components	35.1
T. R. Ramakrishna, <i>Member of the Technical Staff, AT&T Bell Laboratories, Holmdel, NJ 07733</i>	

- 36. Types of Telephone and Data-Transmission Services** **36.1**
T. R. Ramakrishna, *Member of the Technical Staff, AT&T Bell Laboratories, Holmdel, NJ 07733*

PART 7 BUILDING SECURITY SERVICES

- 37. Intrusion Detection and Alarm Systems** **37.3**
Paul H. Lemke, *Manager, Engineering and Development, Electronic Systems Division, Mosler, Inc., Wayne, NJ 07470*
AND
Norman Ellison, *Staff Engineer, Electronic Systems Division, Mosler, Inc., Wayne, NJ 07470*
- 38. Fire Detection Sensors and Alarm Systems** **38.1**
Wayne D. Moore, *President/C.E.O., Mass Fire Alarms of New England, Lowell, MA 01851*

Index follows Chapter 38

**Systems and practices for
maximum efficiency, safety, and service**

HANDBOOK OF UTILITIES AND SERVICES FOR BUILDINGS

The utilities and services that form the functional heart of all buildings, large and small, are a crucial concern in design, construction, remodeling, or renovation. Now, for the first time in a single reference source, here is comprehensive and authoritative information on all aspects of the design, specification, and installation of building utilities and services. Thirty-eight chapters, each written by an acknowledged authority, provide a practical and authoritative resource for architects, engineers, contractors, and other technical professionals. The Handbook provides descriptions, design guidelines, and performance data for:

- *Water Supply Services.* Fifteen chapters treat virtually every aspect of water supply services, from general issues of quality, distribution, and pressure to specific guidelines for sizing, piping, specifications, installation, testing, seismic protection, and sprinkler systems.
- *Drainage Services.* Sanitary drainage, vent, and storm-water drainage systems.
- *Refuse Disposal Services.* Methods of refuse disposal and their advantages and disadvantages.
- *Gas Supply Services.* Standards and codes, system design, installation, and connections.
- *Electrical Supply Services.* All aspects from service entry to circuit protection, presented with a minimum of mathematical detail.
- *Telecommunications Services.* Telephone and data-transmission services, in a detailed and authoritative treatment based upon AT&T expertise.
- *Building Security Services.* Descriptions of fire and intrusion alarm systems and sensors, from top authorities in the field.

Cover Design: Richard Adelson



9 780070 268296

ISBN 0-07-026829-0



For more information about other McGraw-Hill materials, call 1-800-2-MCGRAW in the United States. In other countries, call your nearest McGraw-Hill office.

McGraw-Hill Publishing Company
Serving the Need for Knowledge
1221 Avenue of the Americas
New York, NY 10020