

TABLE OF CONTENTS

Preface and Acknowledgments to the Second Edition	v
Preface to the First Edition	vii
Acknowledgments to the First Edition	ix
List of Tables	xi
Nomenclature	xiii

PART 1: Building and Plant Components

1 Fire and Explosion Protection	1
2 Building Codes	1
3 Occupancy Hazard Type	1
4 Building Fire Resistance Classifications	2
5 Building Fuel Loading	3
6 Thermal Properties of Building Materials	3
7 Protecting Steel Construction	4
8 Smoke Control	4
9 Ducts and Open Plenums	5
10 Elevator Capture	5
11 Volumetric Limits on Containers and Portable Tanks	5
12 Protecting Hydraulic Equipment	6
13 Protecting Electrical- and Power-Generating Plants	6
14 Drainage	8
15 Record Keeping	8

PART 2: Detection and Warning Systems

16 Factors in Designing Fire Protection Systems	9
17 Approval of Equipment	9
18 Primary Detectors	10
19 Manual Stations	10
20 Heat Detectors	10

21 Smoke Detectors	10
22 Flame Detectors	11
23 Secondary Detectors	11
24 Miscellaneous Detectors	11
25 Local Signal Devices	11
26 Monitoring and Signaling Equipment	12
27 Standby Panel Power	12
28 Wiring and Zoning	12
29 Signaling	12
30 Weatherability	13

PART 3: Fire Protection Methods

31 Fire and Explosion Control	14
32 Portable Extinguishers	14
33 Dry Chemical Systems	15
34 Hose and Standpipe Systems	15
35 Foam Systems	16
36 Halon Systems	16
37 Carbon Dioxide Systems	17
38 Fixed Water Sprinkler Systems	17
39 Preaction Sprinkler Systems	18
40 Deluge Systems	18

PART 4: Design of Water Sprinkler Systems

41 Schedule- vs. Hydraulically-Designed Sprinkler Systems	19
42 Sprinkler vs. Water Spray Systems	19
43 Conventional vs. Residential Sprinklers	19
44 Tree vs. Loop Sprinkler Systems	20
45 Responsibility for Design	20
46 Sprinkler System Diagrams	21
47 Sprinkler System Materials	21
48 Types of Allowed Pipe	21
49 Pipe Hangers and Braces	21
50 Valves	22

51	Pressure-Reducing and Pressure-Regulating Devices	23	86	Flash Point	48
52	Sprinkler Supply Parameters vs. Occupancy Type	23	87	Combustible and Flammable Liquids	49
53	Sources of Water for Firefighting	24	88	Fire Point	49
54	Flow Measurement in Sprinkler Systems	25	89	Vapor Density: Vapors and Dusts	49
55	Water Tanks	25	90	Explosive Limits	49
56	Fire Hydrants	26	91	Ignition Temperature	49
57	Supply Pumps for Firefighting	26	92	Factors Affecting Dust Explosions	49
58	Sprinkler Head Characteristics	28	93	Explosion Prevention Systems	50
59	Sprinkler Temperature Ranges	29	94	Explosion Hazard Classification	50
60	Sprinkler Life	29	95	Explosion-Proof Equipment	51
61	Sprinkler Discharge Characteristics	29	96	Sources of Ignition	51
62	Sprinkler Protection Area	30	97	Static Electricity	51
63	Discharge Density	31	98	Inerting and Purging	52
64	Distance Between Sprinklers	33	99	Fire Protection Guidelines for Dust Hazards	52
65	Ceiling Height	34	100	Explosion Suppression	52
66	Protecting Process Tanks	34	101	Explosion Containment	53
67	Schedule Design	34	102	Explosion Relief	53
68	Maximum Number of Branch Sprinklers	35	103	Preventing Explosion Propagation	53
69	Special Layout Rules	35	104	Dilution of Hydrocarbon Vapors	54
70	Area Covered by Sprinklers	35	PART 6: Practice Problems		56
71	Friction Losses	36	Appendices		
72	Minor Losses	36	A:	Typical Thermal Properties of Selected Building Materials (English units)	72
73	Velocity Pressure	37	B:	Friction Loss in Schedule-40 Steel Pipe (English units)	73
74	Normal Pressure	38	C:	Friction Loss in Schedule-40 Steel Pipe (SI units)	74
75	Hydraulic Design Concepts	38	D:	Equivalent Lengths of Valves and Fittings for Fire Protection Systems	75
76	Hydraulic Design Procedure: Pressure Along Branches	39	E:	Approximate Properties of Selected Flammable Liquids and Gases	76
77	Hydraulic Design Procedure: Pressure at Cross-Mains	42	F:	Standard Sprinkler System Worksheet	78
78	Hydraulic Design Procedure: Pressure in Risers	45	G:	Standard Symbols of Fire Sprinkler Components	79
79	Allowances for Hose Streams	46	H:	Internal Dimensions of Standard Steel Pipe	80
80	Nozzles for Hand Line Hoses	46	I:	Internal Dimensions of Standard Copper Tube	81
81	Friction Losses in Hoses	46	Index		83
82	Inspection and Maintenance of Fire Sprinkler Systems	47			
PART 5: Explosion Protection Systems					
83	Introduction to Explosions	48			
84	Secondary Explosions	48			
85	Explosive Conditions	48			