Alpha
Engineering Consultant
2 ALEXANDRA ROAD, #03-03 DELTA HOUSE, SINGAPORE 159919
TEL: (65)6276 2228 FAX: (65)6276 9929 E-MAIL: aec@alpha.com.sg

Our Ref: OM-LC/014

8 April 2005

MEMORANDUM

To: All Engineering Staff

From: Andrew Loh

SINGAPORE STANDARD CP 52: 2004 CODE OF PRACTICE FOR AUTOMATIC FIRE SPRINKLER SYSTEM

We have received a complimentary copy of the latest code from Spring Singapore for the Code of Practice for Automatic Fire Sprinkler System.

The above is kept in the Library for reference.

ANDREW LOH

cc TLS/RT
cc Memo File

/kt

BCA
ISO 9000
CERT. NO.: 236
SS ISO 9001 : 2000

Contents

Page

Foreword 9

CLAUSES

1 Scope 11
2 Definitions 11
3 Classes of sprinkler system and design data 17
4 Installation 33
5 Water supplies 38
6 Spacing and location of sprinklers 67
7 Sprinklers, sprayers and multiple controls 79
8 Piping 82
9 Valves and ancillary equipment 91
10 Light hazard class systems 100
11 Ordinary hazard class systems 102
12 High hazard class systems 112
13 Full hydraulic calculation of sprinkler systems 128

ANNEXES

A Orifice plates 172
B Pipework interpretations 175
C Maintenance 178

TABLES

1 Maximum floor area for dry pipe systems 28
2 Design densities of discharge and assumed areas of operation for standard sprinkler systems 31
3 Appropriate suction pipe sizes 41
4 Minimum depth of water and width of open channels and weirs for corresponding inflows 43
5 Performance characteristics for automatic pumps drawing from pump suction tanks 48
6 Pressure loss for medium tubes to SS 17 66
7 Value of K for steel tubes to SS 17 66
8 Sprinkler distances from beams and joists 69
9 Distance from sidewall sprinklers to beams 70
10 Sprinkler K factors, orifice and thread sizes 80

Page

11	Colour coding of sprinklers	81
12	Verification test loads	91
13	Guide to sizes for pipes and associated components in pumpsets	95
14	Performance characteristics for automatic pumps drawing from pump suction tanks	101
15	Pressure/Flow requirements for ordinary hazard class systems	103
16	Water storage capacity for ordinary hazard class systems	104
17	Performance characteristics for automatic pumps drawing from pump suction tanks	106
18	Maximum number of sprinklers on pre-calculated piping	109
19(A)	Pressure losses for medium tubes to SS 17	110
19(B)	Pressure losses for medium tubes to SS 17 – Ordinary hazard	110
20	Discharge density and assumed area of operation for process risks	113
21(A)	Discharge density and assumed area of operation for high piled storage risks involving free-standing storage or block stacking where ceiling or roof protection is provided	114
21(B)	Discharge density and assumed area of operation for high piled storage risks involving post or box pallets (in single or double rows) or palletised rack storage where roof or ceiling protection only is provided	114
22	Discharge density and assumed area of operation at ceiling for bonded stores (spirituous liquors) rack storage	118
23	Pressure/Flow requirements for high hazard class systems	119
24	Water storage capacity for high hazard class systems	121
25(A)	Maximum number of sprinklers on pre-calculated piping for design densities of discharge not exceeding 15 mm/min	124
25(B)	Maximum number of sprinklers on pre-calculated piping for design densities of discharge not exceeding 15 mm/min	125
25(C)	Maximum number of sprinklers on pre-calculated piping for design densities of discharge up to 30 mm/min	126
26	Pressure losses for medium tubes to SS 17	127
27	Design roughness coefficients	133
28	Mean internal diameters and values of K for steel tube to AS 1074	133
29	Mean internal diameters and values of K for steel tube to AS 1432	134
30	Equivalent pipe lengths for fittings and valves (applicable to Hazen-Williams C value of 120 only)	135
31	Orifice plates for pipes of sizes 50 and 65 for a flow rate of 500 L/min	173
32	Orifice plates for pipes of sizes 80, 100, 150 and 200 for a flow rate of 5000 L/min	173
33	Orifice plate thickness	174

FIGURES

1	Typical end-centre arrangements	137
2	Typical end-side arrangements	137
3	Typical ordinary hazard class system	138

Page

4	Piping terms used in Figure 7	139
5	Arrangement of supply piping and valves, tail-end freeing solution system	139
6	Symbols used in Figure 7	140
7	Typical water supplies	141
8	Effective capacity of pump suction tanks	143
9	Vortex inhibitors	144
10	Minimum dimensions for supplies from inexhaustible source	145
11	Typical pressure switch test arrangement	146
12	Typical layout for proving water supplies	146
13	Typical flow-measuring devices	147
14	Standard spacing	148
15	Staggered spacing	148
16(a)	Sprinkler distances from beams and joists	149
16(b)	Conventional sprinklers installed upright	149
16(c)	Spray sprinklers (upright and pendent types) and conventional sprinklers installed pendent	150
17	Typical grain elevator	151
18	Bag type dust receiver	152
19	Machines in tiers	152
20	Typical pipe support components	153
21	Typical method of support for long span	155
22	Typical remote test valve	156
23	Intermediate level protection	157
24(a)	Typical bonded stores (spirituous liquors) – double storage rack	159
24(b)	Typical bonded stores (spirituous liquors) – continuous racking	160
25(a)	Typical extra high hazard class system pipe sizes based on Table 25(A)	161
25(b)	Typical extra high hazard class system pipe sizes based on Table 25(B)	162
25(c)	Typical extra high hazard class system pipe sizes based on Table 25(C)	163
26	Determination of area covered per sprinkler	164
27(a)	Typical hydraulically most favourable and most unfavourable areas of operation in a terminal main system with terminal range pipes	165
27(b)	Hydraulic design of most unfavourable area of operation assuming 20 mm/min minimum discharge density over 260 m^2	166
27(c)	Typical hydraulically most favourable and most unfavourable areas of operation in a terminal looped system with terminal range pipes	167
27(d)	Hydraulic design of most unfavourable area of operation assuming 20 mm/min minimum discharge density over 260 m^2	168
27(e)	Typical hydraulically most favourable and most unfavourable areas of operation in a gridded system	169
27(f)	Hydraulic design of most unfavourable area of operation assuming 20 mm/min minimum discharge density of over 260m^2	170

Page

28 Illustration of installation notice ____ 171
29 Ordinary and extra high hazard – armpieces and risers (or drops) ____ 175
30 Ordinary and extra high hazard – armpieces and risers (or drops) ____ 176
31 Ordinary and extra high hazard – armpieces and risers (or drops) ____ 177