

Luciano Coccagna

CHEMICALS FOR WATER DISINFECTION

contributi di

Claudia Lasagna

e Giorgio Temporelli

FrancoAngeli

INDEX

Preface	pag.	9
Introduction	»	11
1. Disinfection mechanisms	»	13
1.1. Looking for a definition	»	13
1.2. Removal	»	15
1.2.1. Conventional systems	»	16
1.2.1.1. With sedimentation step	»	16
1.2.1.2. Without sedimentation step	»	20
1.2.1.3. Direct filtration	»	21
1.2.1.4. Conventional system vs direct filtration in terms of particles removal	»	21
1.2.1.5. Conventional system vs direct filtration	»	26
1.2.2. Barrier separation	»	28
1.3. Killing/Inactivation	»	33
1.4. Factors affecting disinfection	»	39
1.5. Disinfectants impurities	»	42
1.5.1. Sodium Hypochlorite storage	»	42
1.5.2. ClO_2 reactions & reagents	»	44
2. Disinfectants and peculiar mode of action	»	46
2.1. Chlorine and its derivatives	»	46
2.1.1. Generality and chemical characteristics	»	46
2.1.2. Disinfection mechanism	»	58
2.2. Chlorine Dioxide	»	59

2.2.1.	Generality and chemical characteristics	pag.	59
2.2.2.	Disinfection mechanism	»	66
2.3.	Ozone and Oxygen	»	67
2.3.1.	Generality and chemical characteristics	»	67
2.3.2.	Disinfection mechanism	»	79
2.4.	Chlorocyanurates/Chlorocyanuric Acid	»	81
2.4.1.	Generality and chemical characteristics	»	81
2.4.2.	Disinfection mechanism	»	84
2.5.	Peroxidants	»	84
2.5.1.	Generality and chemical characteristics	»	84
2.5.2.	Disinfection mechanism	»	87
2.6.	Other Oxidants	»	91
2.6.1.	Generality and chemical characteristics	»	91
2.6.2.	Disinfection mechanism	»	94
2.7.	Miscellaneous	»	95
2.7.1.	Silver and Silver salts. Silver & Copper	»	95
2.7.2.	Diamonds	»	96
2.7.3.	Solar disinfection (SODIS)	»	96

3. Technical Specifications of disinfectants (EN Standards overview)

3.1.	Introduction	»	98
3.1.1.	Acetic Acid	»	99
3.1.2.	Calcium Hypochlorite	»	102
3.1.3.	Chlorine	»	104
3.1.4.	Chlorine Dioxide	»	108
3.1.5.	Ethanol	»	111
3.1.6.	Hydrochloric Acid	»	114
3.1.7.	Hydrogen Peroxide	»	117
3.1.8.	Oxygen	»	119
3.1.9.	Ozone	»	122
3.1.10.	Potassium Permanganate	»	126
3.1.11.	Potassium Peroxomonosulfate	»	129
3.1.12.	Silver salts for the conservation of drinking water for intermittent use	»	132
3.1.13.	Sodium Chlorate	»	135
3.1.14.	Sodium Chlorite	»	137
3.1.15.	Sodium Dichloroisocyanurate Dihydrate	»	140
3.1.16.	Sodium Hypochlorite	»	143

3.1.17.	Sodium Permanganate	pag.	146
3.1.18.	Sodium Peroxodisulfate	»	149
3.1.19.	Trichloroisocyanuric Acid	»	152
Bibliography		»	157
Acronyms		»	161
Glossary		»	165