

CONTENT

	Page
Introduction	1
Solid-Liquid Separation using filters	2
Nomenclature	2
Introduction	2
Basic theory	4
Flow through Granular Beds	4
Cake Filtration	5
Nature of Initial Resistance	6
Influence of Initial Filtration Velocity	8
Influence of Vibrations	8
Instability of the Cake Structure	10
Principal Mechanisms of Filtration	10
Filter Aid Filtration	10
Theory of Filter Aid Filtration	18
Filter Aid Septa	22
Depth Filtration	27
Membrane Filtration	32
Cartridge Filters	39
Disposable Cartridges	39
Cleanable Cartridges	40
Electrical Separation	41
Filter Equipment	41
Filter Press	43
Filter Press Media	46
Leaf Filter	51
Candle Filter	51
Rotary Vacuum Drum Precoat Filter	56
Applications	66
Beer	66
Wines and Spirits	69
Fruit Juices	70
Edible Oils	70
Sugar Syrups	75
Process Water	75
Milk	78
Brine Regeneration	78
Miscellaneous	78
Conclusions	78
Suggestions for Future Work	81
Solid-Liquid Separation Using Centrifuges	82
Nomenclature	82
Introduction	82
Theoretical Performance Predictions	84
Equipment	92
Tubular Bowl Centrifuge	96
Multichamber Centrifuges	96
Imperforate Basket Centrifuges	96
Scroll Centrifuges	96

Disc Centrifuge	99
Selection and Scale-Up of Centrifuges	101
Applications	103
Vegetable Oil Refining	103
Animal Fat Production	103
Beverage Production	104
Coffee and Tea Production	104
Vinegar Production	104
Sugar Production	104
Conclusions	105
Recommendations for Further Work	105
Solid-Liquid Separation using Hydrocyclones	106
Nomenclature	106
Introduction	106
Description	106
Flow Characteristics	106
Theory	108
Stoke's Law	108
Intermediate Law	110
Newton's Law	110
Efficiency	111
Pressure Drop	114
Volume Split	115
Variables Affecting the Performance of Hydrocyclones	116
Design Variables	116
Operating and Product Variables	118
Equipment and Operational Performance	119
Applications	120
Conclusions	124
Advantages	124
Disadvantages	126
Recommendations	126
Suggestions for Future Work	126
Selection of Equipment	127
References	134