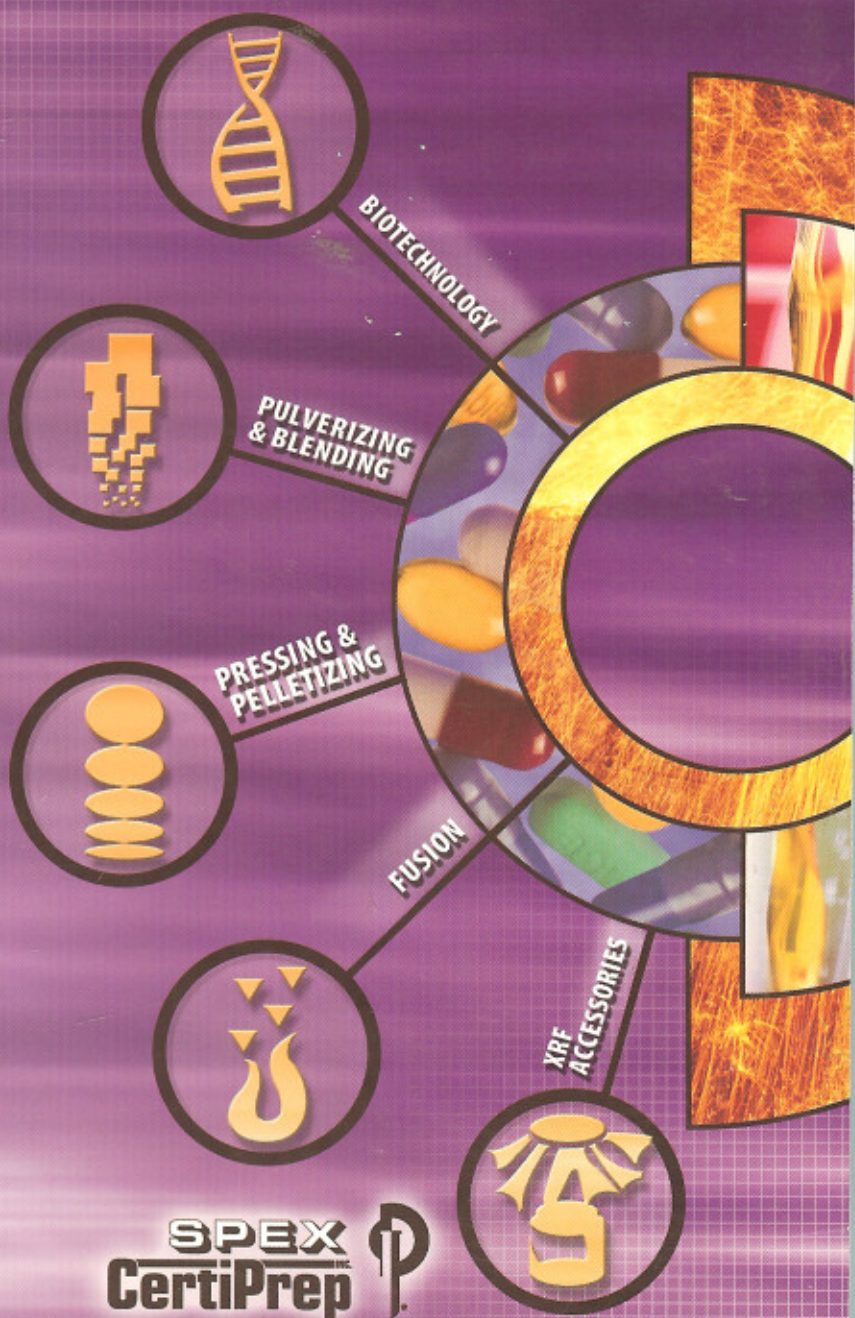


HANDBOOK OF SAMPLE PREPARATION AND HANDLING



SPEX CertiPrep Handbook of Sample Preparation and Handling

Seventh Edition Contributing Editors

Ralph H. Obenauf, Ph.D
Richard Bostwick
William Fithian
Mena DeStefano
William Mack

SPEX CertiPrep, Inc.

203 Norcross Avenue
Metuchen, NJ 08840

1-800-LAB-SPEX • 732-549-7144 • Fax 732-603-9647

E-mail: sampleprep@spexcsp.com

Website: <http://www.spexcsp.com>

TABLE OF CONTENTS

Chemical Elements and Symbols	2
Periodic Chart of the Elements	3
How to Order	5
How to Use This Handbook	12

SECTION I PRODUCT INFORMATION

Chapter One

Biotechnology

Introduction	14
Products for Biotechnology	
2000 Geno/Grinder	15
Freezer/Mills	18
6750 Freezer/Mill	18
6850 Freezer/Mill	19
Freezer/Mill Accessories	19
6750 Accessories	20
6850 Accessories	21
6820 Auto-Fill System	23

Chapter Two

Pulverizing and Blending

Introduction	26
Products for Pulverizing and Blending	
Freezer/Mills	27
6750 Freezer/Mill	27
6850 Freezer/Mill	28
Freezer/Mill Accessories	28
6750 Accessories	29
6850 Accessories	30
6820 Auto-Fill System	32
5200 Micro Hammer-Cutter Mill and Screens	33
Mixer/Mills	34
5100 Mixer/Mill	34
Mixing and Grinding Containers for 5100	35
8000D Mixer/Mill	38
8000M Mixer/Mill	40
Mixing and Grinding Containers (8000 Series)	41
Adapters and Smaller Vials (8000 Series)	45
Shatterboxes	49
8500 Shatterbox	49
8515 Shatterbox	50
Shatterbox Grinding Containers	53
Shatterbox Accessories	54

Chapter Three

Pressing and Pelletizing

Introduction	56
Products for Pressing and Pelletizing	
3624B X-Press	57
3630 X-Press	58
3628 Bench Press	59
Manual Presses (SPEX CertiPrep-Carver)	60
Pellet Dies and Accessories	62
Sleeve-and-Plunger Sets for Pellet Dies	63
Replacement Pellets for Pellet Dies	64
Spec-Caps for Reinforcing XRF Pellets	65

Chapter Four

Fusion

Introduction	68
Products for Fusion	
SPEX CertiPrep-Claisse Automated Fusion Fluxers	69
SPEX CertiPrep-Claisse Fluxer Crucibles, Molds, and Accessories	74
Graphite Crucibles and Handling Equipment	76
Fusion Fluxes	79
Non-Wetting Agents	80

Chapter Five

XRF Accessories

Introduction	84
Products for XRF	
Spec-Caps for Reinforcing XRF Pellets	85
PrepAid Grinding Aid and KBr Pre-weighs	86
PrepAid Binders	87
X-Cells for XRF Liquid Samples	88
Thin Film for XRF Cell Windows	90
Certified Reference Materials (CRM Division)	93
Services Available	93
Products	94

SECTION II TECHNICAL INFORMATION

Chapter One

Biotechnology

Comparison of Methods for the Isolation of DNA from Soybean	100
Materials and Methods	100

DNA Purification	
Qiagen DNeasy Plant Kit	101
Promega Wizard Genomic Purification Kit	101
CTAB Method	102
Qiagen Genomic Column	102
Results and Discussion	103
High Throughput Disruption of Yeast	
Materials and Method	105
Results and Discussion	105
Products for Biotechnology	
2000 Geno/Grinder	106
Cryogenic Grinding	107
Summary of the Many Uses for Freezer/Mills	108
Freezer/Mills	109
6750 Freezer/Mill	109
6850 Freezer/Mill	109
Guide to Freezer/Mill Capacity	112
Limits to Cryogenic Grinding	113

Chapter Two

Pulverizing and Blending

Introduction	116
Grinding Container Materials	117
How to Select Grinding Containers	118
Charts	
Sample Container Materials Selection	119
Containers for Grinding and/or Blending	120
Key Points About Grinding	122
Cryogenic Grinding	125
Summary of the Many Uses for Freezer/Mills	126
Products for Pulverizing and Blending	
Comparison of Laboratory Mills—Chart C	130
Freezer/Mills	132
Guide to Freezer/Mill Capacity	135
Micro Hammer-Cutter Mill	138
Mixer/Mills	140
8000 Mixer/Mill Grinding Test Summary	146
Shatterboxes	147
Shatterbox Grinding Test Summary	150
Composition of Standard Steels	151

Chapter Three

Pressing and Pelletizing

Introduction	154
Preparing Powder Samples for XRF	155

Particle Size Effects	156
Pressing Sample Discs	158
Care and Maintenance of Pellet Dies	159
Set-up and Loading of Pellet Dies	161
Proper Use of Spec-Caps	161
Binders	162
Sleeve-and-Plunger Technique	165
Anti-sticking Agents	166
Pressing the Sample Disc	167
Use of Vacuum in Pellet Pressing	168
Sample Disc Removal	169
Sample Disc Handling	169
Trouble Shooting	170
Selecting a Pellet Die	172
Choosing a Laboratory Press	173
3630 Automated X-Press	173
3624B X-Press Motorized Hydraulic Press	174
3628 Bench Press	175
SPEX CertiPrep-Carver Manual Hydraulic Presses	176

Chapter Four

Fusion

Introduction	178
When to Employ Borate Fusion	178
How to Prepare a Fused Sample	180
Selecting a Fusion Flux	182
Additives for Fusion	183
Products for Fusion	
Automated Fluxers	186
Graphite Crucibles	189

Chapter Five

XRF Accessories

Introduction	192
Reinforcing XRF Pellets	193
X-Cells for XRF	193
Bubble-Free Cell Insert	194
Selecting Thin Film Windows for XRF	195
Thin Film Transmission Diagram	198
Chemical Resistance Tables	199
Bibliography	204
Trademark References	205

Catalog Number Index
Subject Index
Questionnaire for Test Grinding of Samples
Conversion Factors