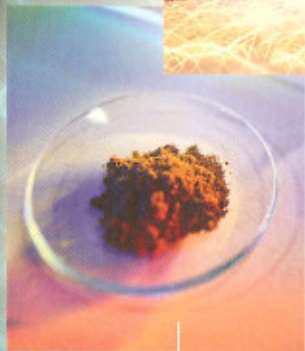


Pulverizing and Blending Fusion



Biotechnology



XRF
Accessories



Handbook of SAMPLE PREPARATION AND HANDLING

Pressing and Pelletizing

SPEX
SamplePrep
Member SPEX CertiPrep Group



Handbook of SAMPLE PREPARATION AND HANDLING

Tenth Edition Contributing Editors

Ralph H. Obenauf, Ph.D.

John Martin

Richard Bostwick

Melissa Davic

Heather Brousell

Keith Tucker

Mena Yannetta

Barbara Baumann

SPEX SamplePrep, LLC

203 Norcross Ave.

Metuchen, NJ 08840

Phone: 732-549-7144 / 800-LAB-SPEX

Fax: 732-906-2492

E-mail: sampleprep@spexcsp.com

Website: www.spexcsp.com

European Division:

SPEX CertiPrep Ltd.

2 Dalston Gardens

Stanmore

Middlesex HA7 1BQ

United Kingdom

Phone: + 44 (0) 20 8204 6656

Fax: + 44 (0) 20 8204 6654

E-mail: Sales@SpexCertiPrep.co.uk

Website: www.spexcertiPrep.co.uk

Table of Contents

Chemical Elements and Symbols.....	2
Periodic Chart of the Elements.....	3
Introduction.....	4
How to Order.....	6
Table of Contents.....	9
How to Use This Handbook.....	14

SECTION I PRODUCT INFORMATION

Chapter One

Biotechnology

Introduction.....	16
Products for Biotechnology	
Geno/Grinder.....	17
Geno/Grinder Accessories.....	18
Freezer/Mills.....	28
6770 Freezer/Mill.....	29
6870 Freezer/Mill.....	30
Freezer/Mill Accessories.....	31

Chapter Two

Pulverizing and Blending

Introduction.....	40
Products for Pulverizing and Blending	
Freezer/Mills.....	41
6770 Freezer/Mill.....	42
6870 Freezer/Mill.....	43
Freezer/Mill Accessories.....	44
6770 Accessories.....	44
6870 Accessories.....	45
6814 AutoExtractor.....	49
6820 Auto-Fill System.....	49
5200 Micro Hammer-Cutter Mill and Screens.....	51
Mixer/Mills.....	52
5100 Mixer/Mill.....	52
Mixing and Grinding Containers for 5100.....	53
8000M Mixer/Mill.....	56
8000D Mixer/Mill.....	57
Mixing and Grinding Containers (8000 Series).....	59
Adapters (8000 Series) and Smaller Vials.....	64

Shatterboxes	70
8500 Shatterbox	70
8515 Shatterbox	71
8530 Shatterbox	72
Shatterbox Grinding Containers	73
Shatterbox Accessories	75
PrepAid Grinding Aids	76

Chapter Three

Pressing and Pelletizing

Introduction	80
Products for Pressing and Pelletizing	
3630 X-Press	81
3628 Bench-Press	82
Manual Presses	83
Pellet Dies and Accessories	85
Sleeve-and-Plunger Sets for Pellet Dies	86
Replacement Pellets for Pellet Dies	87
Spec-Caps for Reinforcing XRF Sample Disks	88
PrepAid Binders	90

Chapter Four

Fusion

Introduction	94
Products for Fusion	
Katanax Automated Electric Fluxers	95
K1 Automated Electric Fluxer	98
K2 Automated Electric Fluxer	99
Katanax Fluxer Crucibles, Molds, and Accessories	100
Graphite Crucibles and Handling Equipment	103
Fusion Fluxes and Non-Wetting Agents	106

Chapter Five

XRF Accessories

Introduction	110
Products for XRF	
Spec-Caps for Reinforcing XRF Pellets	111
PrepAid Binders	113
X-Cells for XRF Liquid Samples	114
Thin Films for XRF Cell Windows	116
Certified Reference Materials	119
Services Available	119
Products	120
Solid Reference Materials	124

SECTION II TECHNICAL INFORMATION

Chapter One

Biotechnology

Applications for the 2000 Geno/Grinder	128
Comparison of Methods for the Isolation of DNA from Soybeans	128
High Throughput Disruption of Yeast	132
Rapid Preparation of Genomic DNA from Cultured Cells for PCR Analysis	134
Lysing of Bacterial Cells in the 2000 Geno/Grinder	136
Extraction of RNA/cDNA and Genomic DNA from Tissue	137
Products for Biotechnology	
2000 Geno/Grinder	141
Freezer/Mills	142
6770 Freezer/Mill	142
6870 Freezer/Mill	142

Chapter Two

Pulverizing and Blending

Introduction	146
How to Select a Laboratory Mill and Grinding Container	146
Laboratory Mill Comparison - Chart A	149
Containers for Grinding and/or Blending - Chart B	151
Container Material Selection - Chart C	153
Composition of Steels - Chart D	154
Key Points About Cryogenic Grinding	155
Limits of Cryogenic Grinding	156
Freezer/Mill Sample Capacity	157
Cryogenic Grinding for RoHS/WEEE	157
Freezer/Mills and Grinding Tests	160
Key Points About Grinding	166
Grinding Container Materials	166
Contamination	167
Grinding Aids	168
Cleaning Containers	170
Respiratory Protection	170
Infrared Mulls	171
Pelletizing Samples	171
Mechanical Alloying	171
Micro Hammer/Cutter Mill	174
Mixer/Mills and Grinding Tests	176
Shatterbox and Grinding Tests	184

Chapter Three

Pressing and Pelletizing

Introduction	190
Preparing Powder Samples for XRF	191
Particle Size Effects	192
Pressing Sample Disks	194
Technique for Pressing a Sample Disk	195
Use of the Vacuum in Pellet Pressing	196
Set-Up and Loading of Pellet Dies	196
Care and Maintenance of Pellet Dies	197
Proper Use of Spec-Caps	199
Binders	200
Sleeve-and-Plunger Technique	202
Sample Disk Removal	203
Anti-Sticking Agents	204
Sample Disk Handling	205
Trouble Shooting	206
Selecting a Pellet Die	208
Choosing a Laboratory Press	209
3630 Automated X-Press	209
3628 Bench Press	210
SPEX SamplePrep-Carver Manual Hydraulic Presses	211

Chapter Four

Fusion

Introduction	214
When to Employ Borate Fusion	214
How to Prepare a Fused Sample	216
Selecting a Fusion Flux	218
Additives for Fusion	219
Products for Fusion	220
Graphite Crucibles and Accessories	220
Katanax Automated Electric Fluxers	222

Chapter Five

XRF Accessories

Introduction	226
Reinforcing XRF Pellets	227
X-Cells for XRF	227
Bubble-Free Cell Insert	228
Selecting Thin Film Windows for XRF	229
Thin Film Transmission Diagram	232
Chemical Resistance Tables	233

Chapter Six

Application Notes

Geno/Grinder

DNA Extraction from Sugar Beet Leaves	240
Starch and Metabolite Extraction from Leaves	242
RNA Extraction from <i>Aspergillus parasiticus mycelium</i>	243

Freezer/Mills

Cryogrinding Domestic Waste	245
RNA Extraction from Human Cartilage	246
Homogenization of Rice Husks	248
Cryogrinding Polymer Fabrics, Pellets, etc.	250
Post-Grinding Structural Changes in Polymers	252
Fine Grinding of Nafion®, a Fluoropolymer	254
RNA Extraction from Whale and Fish Tissue	255

Mixer/Mills

Milling of Nano-Crystalline Oxides	257
------------------------------------	-----

Bibliography	261
Trademark References	262

Catalog Number Index	263
----------------------	-----

Subject Index	269
---------------	-----

Charts/Tables Index	273
---------------------	-----

Questionnaire for Test Grinding of Samples	275
--	-----

Conversion Factors	Back inside cover
--------------------	-------------------