Extraction Products:
Used to determine the oil and fat content in food, an indispensable tool for food manufacturers and health practitioners. Also used to test for pesticides.

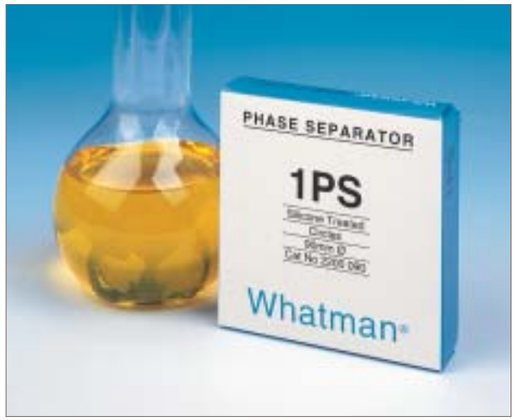
Extraction Products

Whatman offers a unique line of high-quality extraction products to meet a wide range of extraction applications. These products are manufactured from high-alpha cellulose cotton linters for purity and consistent performance.

Separator Paper

Whatman 1PS Phase Separator

The Whatman 1PS Phase Separator is a high-grade filter paper impregnated with a stabilized silicone that renders it hydrophobic, retaining the aqueous phase and passing the solvent phase through.



Automatic Cut-Off, Separatory Funnel Replacement

After being shaken, the mixed phases are simply poured directly into the 1PS circle which is quadrant-folded in a funnel. The separation is extremely rapid so it is unnecessary to wait until the two phases have settled into separate layers. Droplets are automatically separated after only a few moments, giving a solvent phase completely free of the aqueous phase.

In many applications, 1PS can replace the use of separatory funnels. The solvent phase flows through the paper quickly and cleanly. It then stops automatically, leaving the aqueous phase completely in the paper. This feature is particularly important when carrying out a large number of routine solvent extractions at the same time. Samples can be shaken with solvent in stoppered conical flasks or test tubes and transferred directly to funnels containing 1PS.

Unsupervised Separation

A chief benefit of the 1PS method is that cut-off is automatic and complete just as soon as the solvent phase has passed through*. The result is no skilled operators are required.

* Water may break through upon prolonged standing

Features and Benefits

- Ease of use - no special training required
- Any number of separations can be processed together
- Staff involvement in routine separations is at a minimum

Ordering Information - 1PS Phase Separators (Circles)

Catalog Number	Diameter (cm)	Quantity/Pack
2200-070	7	100
2200-090	9	100
2200-110	11	100
2200-125	12.5	100
2200-150	15	100
2200-185	18.5	100
2200-240	24	100
2200-270	27	100

Solid Phase Extraction (SPE)

Whatman SPE devices are designed to concentrate or isolate analytes from complex sample matrices. Available with a variety of packing media, these devices offer the advantage of working with different types of interactions between the sample components, sorbent and suitable eluent. The polarity (polar, non-polar) or charge (anion, cation) of the analyte of interest will determine the proper choice of sorbent and solvent.

Whatman SPE devices have silica-based chemistries and are available in several configurations. Column capacities include 3, 6 and 12 mL sizes. A cartridge format for use with a syringe is also available.

Solid phase extraction is a chromatographic technique used to prepare samples for subsequent analysis by removing interfering substances that may be present. This is done either by retaining the substance of interest and washing off everything else or by retaining the interfering substances and eluting the product of interest.

Whatman SPE devices contain high quality sorbents for LC chromatographers.

Solid Phase Extraction Columns

Features and Benefits
- Available in a range of packing media
- Whatman quality sorbents for consistent results

Applications
- Isolate analytes from complex sample matrices
- Remove interfering substances in order to prepare samples for subsequent analysis
- Drug metabolites in biological fluids
- Food analysis
- Environmental analysis

Solid Phase Extraction (SPE) Discs

The Whatman SPE disc utilizes C-18 derivatized silica, incorporated into a glass microfiber matrix. The high flow and high loading capacity of the glass microfiber media allow for rapid aqueous sample flow rates, while oil, grease and other organic analytes are efficiently extracted and retained by the reverse phase silica material.

Features and Benefits
- High quality Whatman glass microfiber media for superior flow and high loading capacity
- Efficient grease analyte extraction and retention
- Prefilters available for difficult samples

Applications
- Oil and grease analysis, EPA Method 1664A

Sample Drying Device

A sodium sulfate sample drying device is available for removal of water from water-immiscible organic solvent extracts. It attaches to the male luer outlet of a syringe in which the extract has been collected. Traces of water are removed as the sample is pushed through the drying device into a collection vial.

Typical Data - Solid Phase Extraction (SPE) Discs

Product	Key to Sorbent Abbreviations	Description
ODS-4	Octadecyl silane	14% of carbon load, end capped
ODS-5	Octadecyl silane	18% of carbon load, end capped
C-8	Octyl silane	8.5% of carbon load, end capped
FLO	Florisil®	Magnesium silicate (US Silica Company)
SCX	Strong cation exchanger–aromatic benzene sulfonic acid functional groups	-
SAX	Strong anion exchanger–quaternary amino groups (-NR3+)	-

Ordering Information - Solid Phase Extraction (SPE) Discs

Catalog Number	Product Code	Column Volume	Quantity/Pack
Column Type			
6803-0505	ODS-5	500 mg/3 mL	50
6803-0507	ODS-5	500 mg/6 mL	30
6803-0509	ODS-5	1000 mg/12 mL	20
6803-1205	C-8	500 mg/3 mL	50
6803-1809	FLO	1000 mg/12 mL	20
6803-2005	SAX	500 mg/3 mL	50
6803-2605	SCX	500 mg/3 mL	50
Cartridge Type*			
6804-0405	ODS-4	500 mg/unit	50
6804-0505	ODS-5	500 mg/unit	50

* For use with a syringe or vacuum manifold after removing male outlet collar

Ordering Information - Solid Phase Extraction (SPE) Discs

Catalog Number	Description	Filter Media	Diameter (mm)	Pore Size (µm)	Quantity/Pack
6805-3042	SPE Disc for Oil and Grease	-	47	-	20
6805-3043	SPE Disc for Oil and Grease	-	47	-	80
6805-3048	SPE Disc for Oil and Grease	-	90	-	20
6805-3049	SPE Disc for Oil and Grease	-	90	-	80
6805-8034	DFP Prefilter	PP	42.5	5	48
6805-8035	DFP Prefilter	PP	47	5	48
6805-8037	DFP Prefilter	PP	90	5	16

Ordering Information - Sample Drying Device

Catalog Number	Product	Size (mg)	Quantity/Pack
Cartridge Type with Polypropylene Filter			
6805-8020	Sodium sulfate with 0.45 µm - PP filter and tube tip	1500	50

Extraction Thimbles

Whatman cellulose and glass microfiber extraction thimbles are known for their purity and consistent high quality. The thimbles are widely used in Soxhlet extraction units providing a safe, convenient and efficient method of solvent extraction of solids and semi-solids. Soxhlet extraction is a widely used technique for the analysis of fats or pesticides in foods and soil materials and many other procedures that involve a solid-liquid extraction.

High Performance Cellulose Extraction Thimbles

Cellulose extraction thimbles are produced from high-quality alpha cellulose cotton linter and have excellent mechanical strength and retention.

Standard single thickness thimbles have a wall thickness of approximately 1 mm (10 µm nominal particle retention).

Double thickness thimbles have a wall thickness of approximately 2 mm (6 µm nominal particle retention) for applications where higher retention and increased wet or dry strength or rigidity is required.

Standard Cellulose Extraction Thimbles

Thimbles of type 603 are made from high-quality cellulose or pure borosilicate glass fibers. The high purity of the materials ensures reliable and reproducible analytical results. For all automated extraction apparatus in common use, Whatman offers thimbles whose dimensions are matched exactly to those of the thimble holders to guarantee perfect fit.

Typical Data - Standard Extraction Thimbles

Grade	Material	Retention Rate to BS 4400%	Max. Temperature °C
603	Cellulose	-	120
603 g	Borosilicate Glass Fibers*	99	500

* With inorganic binder

Glass Microfiber Thimbles

High-purity glass microfiber thimbles manufactured from 100% pure borosilicate glass are available for specialized applications. The thimbles are completely free of binders or additives and can be used at temperatures up to 500°C or when using solvents incompatible with cellulose thimbles. These thimbles are also used in pollution monitoring techniques (0.8 µm nominal particle retention). Typical thickness 1.7 mm.

Features and Benefits

- Available in a range of sizes and wall thicknesses to suit your application
- Designed to fit most commercially available Soxhlet extractors
- No binders are added

Applications

- Smoke stack gas monitoring
- Soxhlet extraction
- Analyzing pesticide residues
- Determining oil/fat content of foods (e.g. French fries)
- Analysis of oil and grease in solid wastes

Thimble Size Selection

Thimble sizes should be selected carefully to fit extractors correctly. The different sizes represent the established practice of showing the internal diameter and overall length of the thimble in millimetres. Therefore, an extra allowance for wall thickness should be made when calculating external diameters. The thimble should pass through the narrower end of the upper extractor socket, allowing 1-2 mm clearance, and be 5-10 mm above the level of the top of the siphon tube.

Ordering Information - High Performance Cellulose Extraction Thimbles

Single Thickness[1] Catalog Number	Double Thickness[2] Catalog Number	Dimensions (mm)*	Quantity/Pack
Cellulose Thimbles			
2800-105	-	10 x 50	25
2800-166	2810-166	16 x 60	25
2800-185	-	18 x 55	25
2800-199	-	19 x 90	25
2800-226	-	22 x 65	25
2800-228	2810-228	22 x 80	25
2800-258	2810-258	25 x 80	25
2800-259	-	25 x 90	25
2800-250	2810-250	25 x 100	25
2800-266**	2810-266	26 x 60**	25
2800-280	-	28 x 100	25
2800-282	-	28 x 120	25
2800-288	-	28 x 80	25
2800-307	-	30 x 77	25
2800-308	2810-308	30 x 80	25
2800-300	-	30 x 100	25
2800-338	2810-338	33 x 80	25
2800-339	2810-339	33 x 94	25
2800-330	-	33 x 100	25
2800-373	-	37 x 130	25
2800-412	-	41 x 123	25
2800-331	2810-331	33 x 118	25
2800-432	2810-432	43 x 123	25
2800-608	-	60 x 180	25
2800-900	-	90 x 200	25

* Internal diameter and external lengths

** Fits Soxtec™ extractor

[1] Single wall thickness = 1 mm

[2] Double wall thickness = 2 mm

Ordering Information - Extraction Thimbles for Standard Soxhlet Apparatus

Extractor Volume	Dimensions	Wall Thickness (mm)	Quantity/Pack	Catalog Number
According to DIN 12 449				
30	22 x 80	1.5	25	10 350 211
100	33 x 94	1.5	25	10 350 242
250	33 x 205	1.5	25	10 350 250
According to BS 2071				
200	41 x 123	1.0	25	2800-412

Ordering Information - Extraction Thimbles for Automated Extraction Apparatus - Grade 603

Extraction System	Dimensions	Wall Thickness (mm)	Quantity/Pack	Catalog Number
BÜCHI - Extraction System B-811	25 x 100	1.5	25	10 350 219
	22 x 80	1.5	25	10 350 211
	33 x 94	1.5	25	10 350 242
	43 x 123	2.0	25	10 350 267
GERHARDT - Soxtherm Automatic	33 x 80	1.5	25	10 350 240
FOSS Soxtec	31 x 80	1.0	25	10 350 437
Avanti 2050 Auto System				
DIONEX ASE 200*	for 11 mL cell	1.0	25	10 350 106
	for 22 mL cell	1.0	25	10 350 108
	for 33 mL cell	1.0	25	10 350 109
DIONEX ASE 100/300*	for 34 mL cell	1.0	25	10 350 328
	for 66 mL cell	1.0	25	10 350 327
	for 100 mL cell	1.0	25	10 350 315

* Non-stick thimble

Ordering Information - Standard Extraction Thimbles

Dimensions	Wall Thickness (mm)	Quantity/Pack	Catalog Number
Grade 603 (Cellulose)			
22 x 60	2.0	25	10 350 306
22 x 80	1.5	25	10 350 211
25 x 50	1.5	25	10 350 116
25 x 60	1.5	25	10 350 215
25 x 70	1.0	25	10 350 216
25 x 80	1.5	25	10 350 217
25 x 100	1.5	25	10 350 219
26 x 60	1.5	25	10 350 220
27 x 80	1.5	25	10 350 223
27 x 100	1.5	25	10 350 224
28 x 60	1.5	25	10 350 225
28 x 80	1.5	25	10 350 226
28 x 100	1.5	25	10 350 227
30 x 80	1.5	25	10 350 234
30 x 90	1.5	25	10 350 235
30 x 100	1.5	25	10 350 236
33 x 60	1.5	25	10 350 238
33 x 80	1.5	25	10 350 240
33 x 90	1.5	25	10 350 241
33 x 94	1.5	25	10 350 242
33 x 100	1.5	25	10 350 243
33 x 118	1.5	25	10 350 245
33 x 120	1.5	25	10 350 246
33 x 130	1.5	25	10 350 247
33 x 205	1.5	25	10 350 250
34 x 130	1.5	25	10 350 252
35 x 120	1.5	25	10 350 254
35 x 150	1.5	25	10 350 255
40 x 85	2.0	25	10 350 261
41 x 123	2.0	25	10 350 265
43 x 123	2.0	25	10 350 267
48 x 145	2.0	25	10 350 273
48 x 200	2.0	25	10 350 274
44 x 230	2.0	25	10 350 275
75 x 250	2.5	25	10 350 287
80 x 250	3.0	25	10 350 324

Ordering Information - Glass Microfiber Extraction Thimbles

Dimensions	Wall Thickness (mm)	Quantity/Pack	Catalog Number
Grade 603 g (Glass Fiber)			
10 x 38	1.5	25	10 371 103
16 x 50	1.0	25	10 371 005
19 x 90	1.0	25	10 371 007
22 x 80	1.5	25	10 371 011
25 x 65	1.5	25	10 371 014
25 x 80	1.5	25	10 371 017
25 x 100	1.5	25	10 371 019
26 x 63	1.5	25	10 371 122
26 x 100	1.5	25	10 371 023
28 x 60	1.5	25	10 371 025
30 x 100	1.5	25	10 371 036
33 x 94	1.5	25	10 371 042
33 x 100	1.5	25	10 371 043
33 x 118	1.5	25	10 371 045
33 x 205	1.5	25	10 371 050
35 x 150	1.5	25	10 371 055
23.8 x 68*	1.5	25	10 371 114
44 x 230	1.5	25	10 371 075
Glass Microfiber Thimbles – Grade HP-GF			
19 x 90	-	25	2814-199
30 x 100	-	25	2814-300
43 x 123	-	25	2814-432

* Type GOTHE (outer diameter 26.8 mm)