Mill Collection

The Mill collection

Introduction

Good results starts with sample preparation.

Errors caused by analytical instruments are very small compared to the errors associated with sample preparation. Badly prepared samples will automatically result in large analytical errors.

The laboratory sample mill is an important but often overlooked link in the chain of analysis; so important that at FOSS Tecator we regard it as an integral part of the analytical system.

We have therefore developed mills of our own to assure the best analytical results. They are convenient and safe to use and they cover a broad range of grinding applications, including preparation for both traditional wet chemistry and NIR/NIT analyses, with assured high repeatability and reproducibility.

General description

This Mill collection folder presents high quality products that can ensure reliability and reproducibility of the analysis.

The Cemotec™ is optimized for solid samples with a high moisture content, and the Cyclotec™ for dry samples that require a uniform particle size. The Knifetec™ is suitable for small (100 ml) samples of dry, moist or wet materials, and the robust Homogenizer for larger (0.2-2.5 kg) samples with a high fat or oil content.

Various accessories and consumables are available to make routine sample preparation simple. They include a range of sample bottles, grinding rings, blades and impellers.

Sample preparation is an important step in all analytical procedures. It is for example crucial to grind properly to obtain the highest quality of the analytical results.

Analytical errors are more easily reduced in the sample preparation step than in any of the subsequent steps of the analysis.

All samples should be prepared under the same conditions.

On the following pages we show how our Mill collection can crush, grind, mix and homogenize dry samples to a consistency suitable for chemical analysis.

Cemotec™ 1090 Sample Mill

Sample grinding without moisture loss.

Cemotec™ Mill

Cemotec™ Accessories

Features:

- Reliable classic working principle
- Adjustable particle size
- Low noise level

Benefits:

- No loss of moisture
- Officially approved by the Swedish National Board of Agriculture for sample preparation prior to moisture analysis
- Low maintenance demand

Description:

The Cemotec™ Sample Mill is specially designed to grind grain and seed samples without losing any of the moisture content. It is however an excellent mill for all types of sample preparation where the requirements for fineness and uniformity of particle size are moderate.

The Cemotec works on the tried-and-true principle of grinding between two discs, one stationary and one turning. The sample is introduced at the centre of the stationary disc and is crushed between the discs. The distance between the discs is easily adjusted by a graduated knob to control the fineness of the grist.

The Cemotec works silently and effectively at relatively low speed. The rate of grinding is about 3 grams per second. Low speed means low noise, and dust is effectively contained by the seal between the outlet and the sample container.

Cyclotec™ 1093 Sample Mill

Rapid sample preparation for general laboratory analysis.

Features:

- High grinding speed, 4 grams per second
- Adjustable particle size
- Low noise level (75 dBA)

Benefits:

- No thermal degradation of the sample
- Uniform particle size distribution
- Easy handling of samples
- High operator safety
- Low maintenance demand
- Recommended by the Canadian Grain Commission prior to NIR analysis
- Approved by AOAC prior to NIR analysis (4.2.10 16th Ed.)

Cyclotec™ Mill

Description:

The Cyclotec™ Sample Mill is designed for rapid, uniform grinding of a wide variety of feeds, grains, leaves, etc. and also for grinding of chemicals, pharmaceuticals and similar products. Recovery of the sample is complete.

Through its unique design the Cyclotec grinds samples by a high speed action. This action rolls the sample against the inner circumference of a durable grinding surface and then passes it through a fine mesh screen.

The high volume air flow provides self cleaning action and minimum temperature rise; whole series of samples can be ground with minimal cross contamination and without cleanout between samples. Thermal degradation is minimized to provide more accurate results.

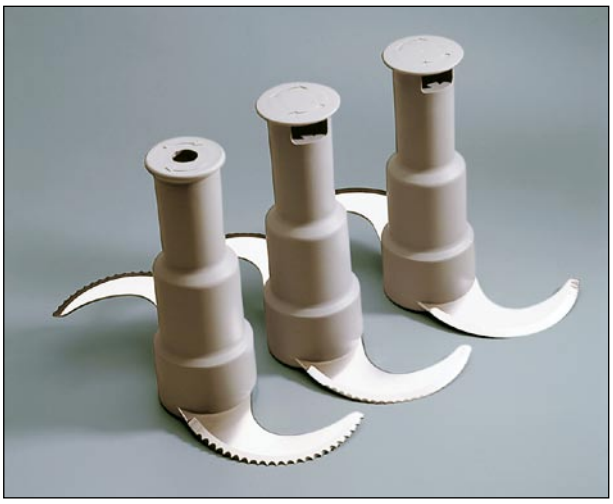
The Cyclotec offers a very rapid and convenient solution to accurate sample preparation for a variety of analytical techniques, e.g. Kjeldahl, Infrared Reflectance, Direct Distillation, Crude Fibre and Extraction.

Cyclotec™ filled with holder for 500 ml sample bottle

2094 and 2096 Homogenizers

Rapid maceration and homogenization of a variety of samples.

Homogenizers



The cutters

Features:

- Powerful cutting action at one or two speeds: 1500 or 1500/3000 rpm
- Sample size from 0.2 to 2.5 kg
- A variety of angled knives for different sample types
- Knives and bowl in stainless steel
- Safety switch

Benefits:

- Rapid and reproducible homogenization
- Easy to clean
- Robust construction

Description:

The 2094 and 2096 Homogenizers are designed for macerating and homogenizing of a variety of high-moisture, high-fat and fibrous samples. Application examples include: size reduction of forage and dry food and chemical products; homogenization of meat, fish, fruit, vegetables, prepared foods (such as pizza, meat pies and frozen meals) and chemical and pharmaceutical formulations.

The Homogenizers allows frozen food samples to be homogenized in a short period of time, providing more accurate analyses of unstable constituents such as vitamins.

A reproducible degree of homogenization is achieved by the mixing action obtained by the angled knives. Homogenization is accomplished through the high speed combined with a powerful cutting action. Angled knife blades produce a vertical flow within the batch and facilitate rapid and thorough homogenization. Complete homogenization is normally achieved in 20 to 60 seconds.

A magnetic safety switch prevents the 2094 and 2096 Homogenizers from being operated without the transparent cover in the locked position.

The 2094 and 2096 Homogenizers comes with a multipurpose micro-teeth cutter. For additional convenience extra stainless steel bowls and smooth blade cutters are available for both Homogenizers. For the 2096 Homogenizer a scalloped cutter is also available.

1095 Knifetec™ Sample Mill

Rapid sample preparation of high-fat, high-moisture and fibrous samples.

Features:

- 20 000 rpm rotor blade for rapid grinding
- Timer controlled
- Sample size up to 100 ml initial volume
- Water cooled
- Safety switch stops rotor in less than 1 second

Benefits:

- Integral tilting system, fully removable lid and rotor blade to facilitate cleaning
- Chamber cooling option reduces adhesion of sample to the wall of the grinder
- No heat generated, making samples suitable for moisture analysis

Description:

The 1095 Knifetec™ Sample Mill is designed for the preparation of high fat, high moisture and fibrous samples prior to analysis. Oilseeds, prepared foods, meat products, fruit, vegetables, grains, seeds and feed samples are examples of suitable sample types.

The high speed rotor blade and timer control ensure very fast and reproducible sample preparation time after time. The normal time to prepare samples is from two to ten seconds.

A safety switch located in the lid prevents accidental operation of the mill with the lid removed.

The Knifetec is equipped with a grinding chamber cooling feature which enables it to be connected to a cold water tap or other laboratory chilling devices. Samples containing high levels of fat have a tendency to stick to the wall of the chamber as the fat softens during grinding, preventing adequate homogenisation. Fibrous samples may generate heat due to friction. Utilizing the cooling option overcomes both these problems, ensuring satisfactory sample preparation.

The fully removable lid, the stainless steel chamber and the removable rotor blade of the Knifetec simplify sample removal and cleaning between samples. This saves a considerable amount of time compared to other techniques. An integral tilting system also simplifies emptying and cleaning.

The design of the 1095 Knifetec ensures rapid, reproducible and safe preparation.

Knifetec™

The sample tray and rotor blades

System description:

Cemotec™ 1090 Sample Mill:

Cemotec 1090 Sample Mill complete with hardened Grinding Discs, disposable Sample Bottles (20), Allen Keys 4 and 5 mm, Hopper with cover, Users' Manual, 200-230 V, 50-60 Hz
Same as above but for 115 V, 50-60 Hz

Accessories

Disposable Sample Bottles (150 ml) of polypropylene with snap-on lid 100/pkg
Disposable Sample Bottles (150 ml) of polypropylene with snap-on lid 500/pkg
Grinding Discs (1 pair)
Seal for Sample Bottle

Cyclotec™ 1093 Sample Mill

Cyclotec 1093 Sample Mill complete with Sample Bottles (125 ml) with snap-on lid (2), screens 0.5 and 1.0 mm, Allen Keys 4 and 6 mm, Seal for Grinding Chamber, Paper Bag for Dust Collection, Seal for Sample Bottle, Users' Manual, 200-230 V, 50 Hz
Same as above but for 115 V 60 Hz
Same as above but for 200-230 V 60 Hz
Same as above but for 115 V 50 Hz

Accessories

Sample Bottles, dark glass for UV protection, 125 ml, case of 104
Sample Bottles, dark glass for UV protection, 125 ml, case of 52
Lid for Sample Bottles
Large Inlet/Forage Assembly Kit
Dust Collection with external connection
Paper Bags for Dust Collection, pack of 10
Dust Filter Pad
Screen 0.5 mm
Screen 0,8 mm
Screen 1.0 mm
Screen 2.0 mm
Seal for Sample Bottle
Seal for Grinding Chamber
Seal for Dust Filter Cover
Seal Kit
Impeller, Standard
Impeller, Nickel-plated for mineral analysis
Holder for 500 ml sample bottle
Sample bottle 500 ml with lid, 1 pcs
Grinding Ring, made of tungsten carbide - Standard
Grinding Ring Tungsten Carbide - Classic
Grinding Ring Heavy Metals 3/set

Homogenizer 2094

Homogenizer complete with stainless steel bowl (3.5 l), multipurpose cutter with microteeth blades, transparent lid and User's Manual, 1 500 rpm, 1 × 230 V, 50 Hz
Same as above but for 1 × 115 V, 60 Hz

Accessories

Stainless steel bowl. 3,5 l
Transparent lid
Cutter with smooth blades
Cutter with microteeth blades
Grindstone for blades

Homogenizer 2096

Homogenizer complete with stainless steel bowl (5.5 l), multipurpose cutter with microteeth blades, transparent lid with integrated scraper and Users's Manual, 1 500 / 3 000, 3 × 400 V, 50 Hz
Same as above but only 1 500 rpm for 1-phase, 115 V, 60 Hz

Accessories

Stainless steel bowl. 5,5 l
Transparent lid with scraper
Cutter with smooth blades
Cutter with scalloped blades
Cutter with microteeth blades
Grindstone for blades

Knifetec™ 1095 Sample Mill

Knifetec Sample Mill complete with rotor blade, PVC tubing 4m, tubing clamp, Users' Manual, 230 V, 50-60 Hz
Same as above and also including Transformer for 115 V operation, 50-60 Hz

Accessories

Rotor blade standard, complete
Rotor blade with sharp knives complete
Rotor blade for small volume
Rotor blade for pellets
Distance for Rotor blade
Disposable Sample Bottles (150 ml) of polypropylene with snap-on lid 100/set
Disposable Sample Bottles (150 ml) of polypropylene with snap-on lid 500/set
Stainless steel tray

* *Ordering information: See separate price-list*

Installation requirements:

Cemotec™ 1090 Sample Mill

Power supply:	200-230 V, 50-60 Hz 115 V, 50-60 Hz
Power consumption:	600 W
Net weight:	18 kg
Dimensions, L × D × H:	220 × 400 × 400 mm
Rotor speed, grinding disc	3 000 rpm

Cyclotec™ 1093 Sample Mill

Power supply:	200-230 V 50 Hz 115 V 60 Hz 200-230 V 60 Hz 115 V 50 Hz
Power consumption:	600 W
Net weight:	18 kg
Dimensions, L × D × H:	220 × 300 × 400 mm
Rotor speed, impeller	10 000 rpm

Homogenizer 2094

Power supply:	230 V 50 Hz 1-phase 115 V 60 Hz 1-phase
Power consumption:	500 W
Net weight:	15 kg
Capacity:	3,5 l bowl. Do not exceed 1,5 l liquid content
Rotor speed:	1 500 rpm
Dimensions, L × D × H:	250 × 410 × 300 mm

Homogenizer 2096

Power supply:	400 V 50 Hz 3-phase 115 V 60 Hz 1-phase
Power consumption:	750 W 1-phase / 1400 W 3-phase
Net weight:	25,5 kg
Capacity:	5,5 l bowl. Do not exceed 2,5 l liquid content
Rotor speed:	1 500 rpm (1-phase) / 1 500 & 3 000 rpm (3-phase)
Dimensions, L × D × H:	270 × 460 × 400 mm

Knifetec™ 1095 Sample Mill

Power supply:	230 V 50-60 Hz incl Transformer 115/230V
Power consumption:	120 W
Net weight:	
7.5 kg	
Dimensions, L × D × H:	190 × 290 × 250 mm
Rotor speed:	20 000 rpm
Water supply:	2 l/min, 8-10°C

Performance data:

Feature	Cemotec™	Cyclotec™	Homogenizer	Knifetec™
Sample Type	Dry samples prior to moisture analysis, up to 20 % moisture and/or 20% fat	Dry samples prior to wet chemistry or IR analysis, up to 15% moisture and/or fat content up to 20%	High-moisture, high-fat and fibrous samples	High-moisture, high-fat and fibrous samples
Applications	Grains, seeds, feed, beans, dry granular foods, fertilizer, tablets	Grains, seeds, cereals, forage, feed, leaves, tablets, tobacco, lime, coal	Forage, dry food, meat, fish, vegetables, prepared foods, chemical and pharmaceutical formulations	Oilseeds, prepared foods, meat products, fruit, vegetables, grains, seeds, and feed
Sample Size	Up to 14 mm	Up to 10 mm, large inlet up to 40 mm	0.2 - 2.5 kg	Maximum 100 ml (50 - 150 g)
Grinding Principle	Two discs, one rotating one stationary	Turbine and sieve	Rotor knives	Rotor blade
Grinding Rate/Time	Appr. 3 g/s	Appr. 4 g/s	20 to 60 s	2 to 10 seconds
Grinding Speed	Grinding disc 3 000 rpm	Impeller 10 000 rpm	Blade 1 500 or 1 500 / 3 000 rpm	Blade 20 000 rpm
Particle Size	Coarse grist	Fine and uniform grist with 0.5 mm screen: max 0.45 mm with 1.0 mm screen: max 0.75 mm	Depending on sample	Depending on sample
Timer	No	No	No	Yes
Safety	Microswitch	Microswitch		Microswitch
Cleaning	Low cross contamination	Low cross contamination	Manual	Manual

Application overview				
Application	**Cemotec™**	**Cyclotec™**	**Homogenizer**	**Knifetec™**
Grains of wheat, oats, barley, rye	+++	+++	+	+++
Soya beans	+	+	+	+++
Rapeseed	+	+	+	+++
Feed pellets	+++	+++	+	++
Hay/Straw		++	+	
Vegetables/Fruit			+++	+
Meat			++	
Meat products			+++	+
Mixed food			+++	+

Subsequent analysis				
Application	**Cemotec™**	**Cyclotec™**	**Homogenizer**	**Knifetec™**
Reference methods				
Protein	+++	+++	+++	+++
Fat low Fat high	+++	+++	++ +++	+++ +++
Fibre crude Fibre dietary	+++	+++	+	++
Moisture low & low fat Moisture low & high fat Moisture high & low fat Moisture hig & high fat	+++ ++	+++	 + +++ +++	++ +++ +++ +++
NIR/NIT	+	+++		+

+++ excellent ++ very good + good

FOSS

FOSS Analytical
69, Slangerupgade
DK-3400 Hilleroed
Denmark

Tel.: +45 7010 3370
Fax: +45 7010 3371

info@foss.dk
www.foss.dk

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