

# RAYPA

Leading  
Lab Technologies



Food analysis

## FIBRE EXTRACTION SYSTEM

F-6P

RELIABLE, VERSATILE AND  
ECONOMIC FIBRE EXTRACTION  
SYSTEM FOR EFFICIENT CRUDE  
AND DETERGENT FIBRE ANALYSES



# Fibre extraction system

Our fibre extraction system is specially optimized for the determination of Crude, Acid and Neutral fibre together with other fractions such as cellulose, hemicellulose and lignin according to the universally known **Weende** and **Van Soest** methods.

Its flexibility to analyze a wide range of samples with subsequent or individual extraction, including boiling and filtration steps, makes our hot fibre extractor suitable for multiple settings and applications.

**F-6P** is designed to guarantee accurate and precise results in compliance with the international standardized methods such as **AOAC**, **AACC** and **ISO**.

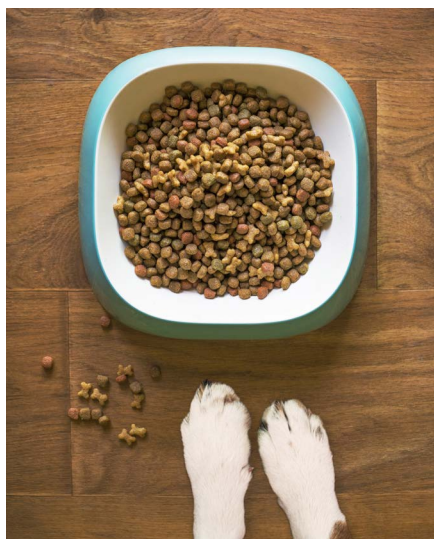


## MAIN FIELDS OF APPLICATION

### FOOD AND FEED INDUSTRY



Forage



Pet food



Cereals



## FEATURES

### HIGHLY EFFICIENT

Simultaneous single or sequential hot extraction of 6 six samples under identical conditions including boiling and filtration.

### TEMPERATURE CONTROL

Control of heat generation by a manual regulator. Guarantees rapid temperature rise until reagent boiling and temperature maintenance at lower levels as required.

### EXEMPT FROM SAMPLE LOSS

Specialized heat resistant Pyrex® crucibles with filters are used for the extraction and filtration of components, preventing any sample loss as the crucibles can be used as sample vessels during extraction, weighing, drying and incineration.

### REAGENT DISCHARGE

During the extraction the reagent can be discharged to the drain or collected for posterior fibre fraction analyses.

### QUALITY AND SAFETY GUARANTEE

Easy to clean and corrosion resistant external frame made of stainless steel grade AISI-304 with epoxy coating. All the electrical and mechanical elements are fully protected.

## BENEFITS



Determination of multiple components.



Integrated peristaltic pump for a faster residue extraction.



Extraction and filtration without sample transfers.



High reproducibility of conditions and results.



According to standardized analysis procedures.



Personalized application support.



Integrated air pump for breaking compact clumps during filtration.



Easy to use.



Powerful quartz heater controlled by a regulator that homogenously heats samples.

### PRESSURE CONTRIBUTION

F-6P has an integrated peristaltic pump for negative pressure to discharge reagents and an air pump for positive pressure to break compact clumps during filtration.

Additionally, F-6P has an available positive pressure connection to EF-6P to break compact clumps during cold extractions, guaranteeing optimal working conditions while using both equipment.

### VERSATILE USE

Multiple fibre portions are measurable across a wide variety of sample types. In each extraction phase, samples can be dried and quantified.

### EFFICIENT EXTRACTION

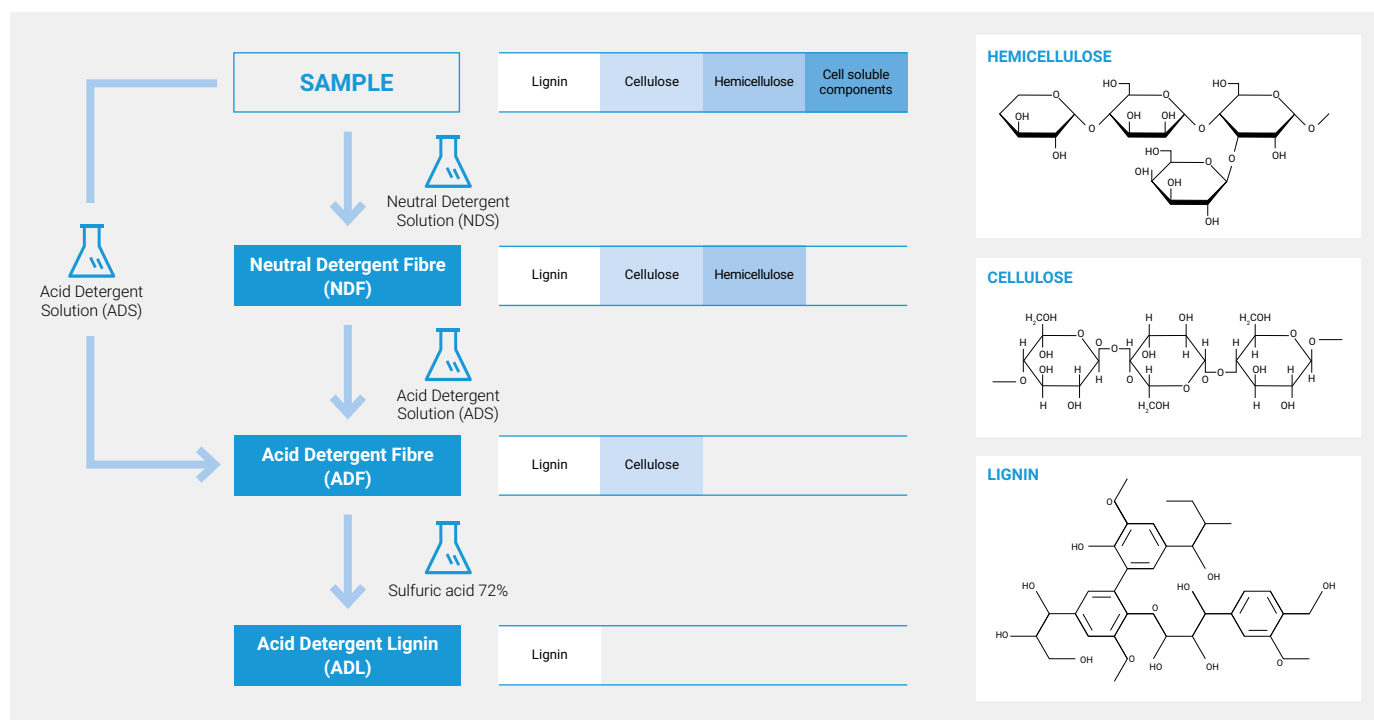
Included peristaltic pump that allows the separation and elimination of reagents and residues quickly and efficiently, guaranteeing reliable and contamination-free analyses.

### ACCORDING TO STANDARDIZED METHODS

Fibre content analysis with F-6P extractors are performed in accordance to official methods described by international entities such as AOAC, AACC and ISO in order to guarantee accurate results.

## Fibre extraction system

### GENERAL OVERVIEW OF VAN SOEST METHOD FOR FIBRE COMPONENTS ISOLATION



### GENERAL OVERVIEW OF WEENDE METHOD FOR CRUDE FIBRE DETERMINATION



#### CRUDE FIBRE

Traditional crude fibre extraction, also known as the **Weende** method, is commonly used to estimate the quality of foods of plant origin on the premise that it constitutes their least digestible fraction, especially in monogastrics forage.

The analysis consists of a subsequent extraction with hot acid (1.25%  $\text{H}_2\text{SO}_4$ ) and alkaline (1.25%  $\text{KOH}$ ) solutions which removes protein, some hemi-cellulose and lignin.

Applications examples:  
EN ISO 6865  
AOAC 978.10

#### DETERGENT FIBRE

Detergent fibre is widely used to estimate the energy intake for ruminants. The analysis is done following the **Van Soest** method which is based on the principle that fibre can be further divided into less digestible fractions:

##### Acid Detergent Fibre (ADF)

Cell wall portions made up of cellulose and lignin. Indicates the amount of forage an animal can digest.

Applications examples:  
EN ISO 13906  
AOAC 973.18

##### Neutral Detergent Fibre (NDF)

Total cell wall including ADF and hemicelluloses. Indicates the amount of forage an animal can consume.

Applications examples:  
ISO 16472  
AOAC 2002:04

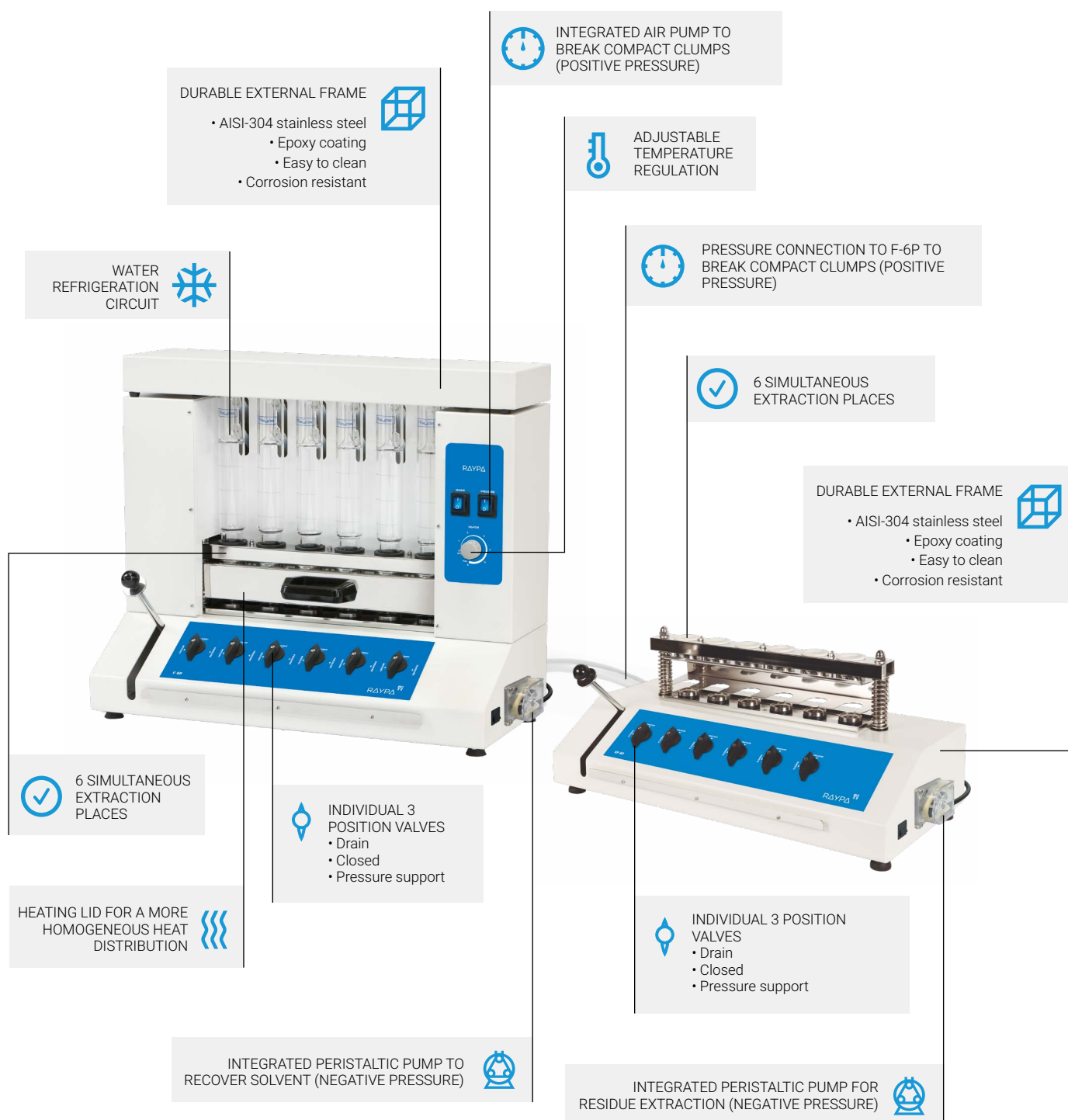
##### Acid Detergent Lignin (ADL)

Lignin fraction of ADF.

Applications examples:  
EN ISO 13906  
AOAC 973.18



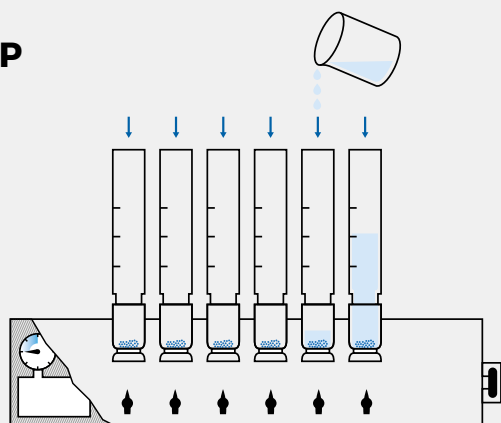
## MAIN FEATURES OF OUR SOLUTION FOR FIBRE EXTRACTIONS



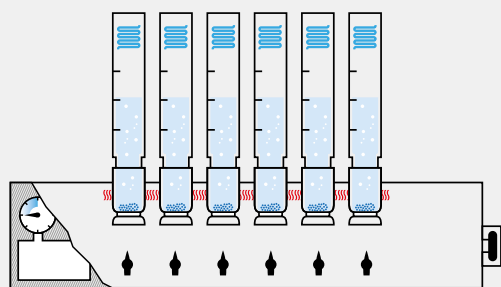
# Fibre extraction system

## EXTRACTION STEPS FOR F-6P & EF-6P

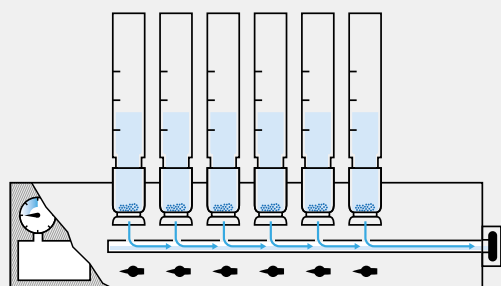
### F-6P



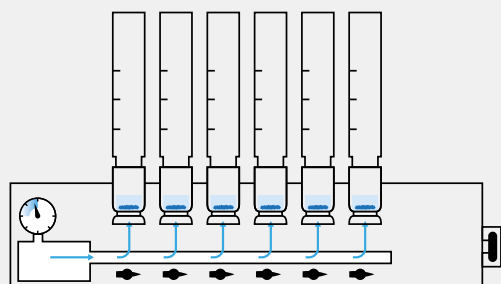
1. Solvent addition.



2. Sample mixing with solvent at boiling temperature and refrigeration circuit turned on.

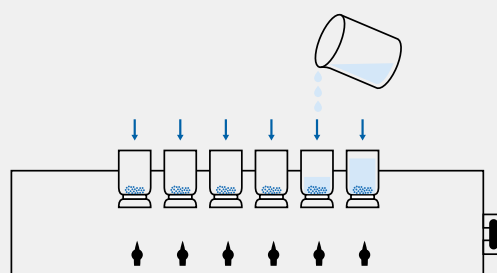


3. Vacuum-assisted filtration with the integrated peristaltic pump, solvent and residue can be recovered.

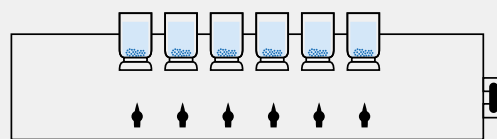


During filtration, it may be necessary to break compact clumps using the integrated air pump.

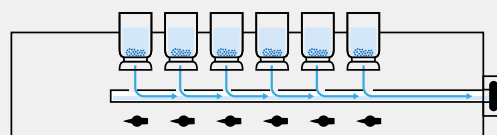
### EF-6P



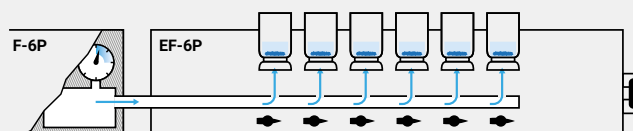
1. Solvent addition.



2. Sample mixing with solvent at room temperature.



3. Vacuum-assisted filtration with the integrated peristaltic pump, solvent can be recovered.



During filtration, it may be necessary to break compact clumps using F-6P's air pump connection.





**F-6P**

### RECOMMENDED APPLICATIONS

- Determination of crude fibre content according to Weende.
- Determination of Acid Detergent Fibre (ADF) and Neutral Detergent Fibre (NDF) according to Van Soest.
- Determination of Acid Detergent Lignin (ADL).

### TECHNICAL DESCRIPTION

- Simultaneous single or sequential hot or cold extraction of 6 six samples under identical conditions including boiling, rinsing and filtration.
- Integrated system without sample transfer or sample loss, samples can be dried or weighed on every stage via heat resistant crucibles.
- Heating by a quartz heater controlled by a manual regulator.
- Built-in water refrigeration circuit for hot extractions.
- Built-in air pump for positive pressure to break compact clumps during filtration, activated by an independent switch.
- Integrated peristaltic pump for negative pressure to drain solvent faster or optional fibre fraction collection, activated by an independent switch.
- Pyrex® crucibles with a nominal porosity of 40-90µm.
- Control of extraction steps by 3-position valves (Closed, Drain and Positive pressure).
- Gaskets and connection hoses made of Viton® compatible with various reagents including acid and base solutions.
- Easy-to-clean and corrosion resistant external frame made of AISI-304 stainless steel painted with epoxy resin.
- All electric and mechanical elements are conveniently protected.

### SUPPLIED WITH THE FOLLOWING COMPONENTS:

- Crucibles set of 6 units.
- Crucibles rack.
- Tong for an individual manipulation of crucibles.
- Tong for a simultaneous manipulation of 6 crucibles.
- Heater lid.
- Several connection hoses.
- Several connection hoses clamps.



**EF-6P**

### RECOMMENDED APPLICATIONS

- Cold extractions with organic solvents, specially cold fat extractions.
- Preliminary sample degreasing before hot fibre extraction.

### TECHNICAL DESCRIPTION








- Simultaneous single or sequential cold extraction of 6 six samples under identical conditions including rinsing and filtration.
- Extraction and filtration without sample transfer or sample loss, via heat resistant crucibles.
- Built-in pressure connection inlet to connect with F-6P to break compact clumps during filtration.
- Integrated peristaltic pump for negative pressure to drain solvent faster, with optional solvent recovery, activated by an independent switch.
- Pyrex® crucibles with a nominal porosity of 40-90µm.
- Control of extraction steps by 3-position valves (Closed, Drain and Positive pressure).
- Gaskets made of EPDM and connection hoses made of GSR compatible with non-polar organic solvents.
- Easy-to-clean and corrosion resistant external frame made of AISI-304 stainless steel painted with epoxy resin.
- All electric and mechanical elements are conveniently protected.

### SUPPLIED WITH THE FOLLOWING COMPONENTS:

- Crucibles set of 6 units.
- Tong for a simultaneous manipulation of 6 crucibles.
- Several connection hoses.
- Several connection hoses clamps.

# Fibre extraction system

## TECHNICAL SUMMARY OF F-6 P

 <b>General info</b>	Extractor general classification	Semiautomatic
	Extraction places	6
	Standards compliance	AOAC, AACC, ISO
	Dimensions L x D x H mm	724 x 330 x 580
	Weight Kg	41
	Power W	1250
	Voltage V	230 V (115 V optional)
	Frequency Hz	50/60
 <b>Recommended applications</b>	Determination of Crude fibre content according to Weende	✓
	Determination of Acid Detergent Fibre (ADF) and Neutral Detergent Fibre (NDF) according to Van Soest	✓
	Determination of Acid Detergent Lignin (ADL)	✓
 <b>Materials</b>	Crucibles	Pyrex® glass
	Crucibles gaskets	Viton®
	Boiling vessels	Borosilicate 3.3
	Tubing	Silicone and Viton®
	External housing	AISI-304 stainless steel painted with epoxy resin
 <b>Technological features</b>	Quartz heater	✓
	Air pump (positive pressure to break compact clumps)	✓
	Peristaltic pump (negative pressure for reagent discharge)	✓
 <b>Control panel</b>	Temperature regulation	Switch + Rotary regulator
	Activation of positive pressure support to break compact clumps	Switch + Individual valves
	Activation of negative pressure support to drain or recover reagents	Switch + Individual valves
 <b>Performance for fibre analysis</b>	Sample capacity/batch units	6
	Sample capacity/day units	36
	Sample quantity per crucible g	0,5 - 3
	Precision (relative) %	± 0,1
	Measuring range %	0,1 - 100
	Reproducibility %	1 - 30
 <b>Functions gained with the accessory cold fat extraction system EF-6P</b>	Preliminary degreasing before hot fibre extraction with F-6P	✓
	Cold fat extraction with acetone or other non-polar organic solvents	✓

✓: Included





## Complete batch handling items included

6 GLASS CRUCIBLES OF P2 POROSITY



1 CRUCIBLES RACK



1 TONG FOR AN INDIVIDUAL MANIPULATION OF CRUCIBLES



1 TONG FOR A SIMULTANEOUS MANIPULATION OF 6 CRUCIBLES



1 HEATER LID



SEVERAL CONNECTION HOSES



SEVERAL CONNECTION HOSES CLAMPS



## Accessories

### CRUCIBLES SET

Reference	CR-P2
Dimensions Ø x H mm	34 x 60
Material	Pyrex® glass
Porosity grade	P2
Nominal porosity µm	40-90
Quantity units	6



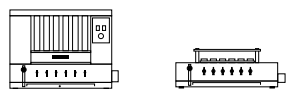
### COLD FAT EXTRACTION SYSTEM

Reference	EF-6P
External dimensions L x D x H mm	715 x 320 x 285
Power W	30
Voltage* V	230
Weight Kg	15
Frequency Hz	50/60
Analysis time min	40
Number of sample positions	6
Compatible crucibles dimensions Ø x H mm	34 x 60



## TECHNICAL DATA

### Dimensions and performance



Reference	F-6P	EF-6P
<b>External dimensions</b> L x D x H mm	724 x 330 x 580	724 x 320 x 285
<b>Power</b> W	1280	30
<b>Voltage*</b> V	230	230
<b>Weight</b> Kg	41	15
<b>Frequency</b> Hz	50/60	50/60
<b>Sample capacity</b>	<b>Batch</b> units	6
	<b>Day</b> units	36
<b>Glass crucible dimensions</b> Ø x H mm	34 x 60	34 x 60

\*Also available with a voltage of 115 V.

### Regulations

Our F-6P fibre extraction system is designed to comply with the strictest international directives and standards, including the following:

- **EN-61010-1** Safety requirements for electrical equipment for measurement, control and laboratory use. **Part 1:** General requirements.
- **EN-61010-2-010** Part 2-010 Particular requirements for laboratory equipment for the heating of materials.
- **EN-61326** Electrical equipment for measurement, control and laboratory use. EMC Requirements.
- **2014/35/UE** Low voltage.
- **2014/30/UE** Electromagnetic compatibility.

### International standardized methods

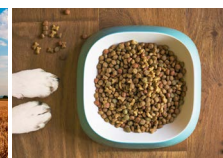
F-6P hot fibre extractors are fabricated guaranteeing compliance with a variety of international standards such as AOAC, AACC and ISO.

### Main fields of application

#### FOOD AND FEED INDUSTRY



FORAGE



PET FOOD



CEREALS

CLICK!  
ACCESS  
THE F-6P  
VIDEO

+ info

YouTube



Find out more about our **F-6P** on our **Youtube Channel**



Installation guide available, please contact us.



REV 06.2021

# RAYPA

Avinguda del Vallès, 322  
Pol. Ind. "Els Bellots"  
08227 Terrassa (Barcelona) Spain

raypa@raypa.com  
www.raypa.com

Tel. +34 937 830 720

R. ESPINAR, S.L.