

INSTITUTE OF RECYCLING TECHNOLOGIES



TECHNICAL EQUIPMENT

ver. 1.7

September 2018



CONTENT

ANALYTICAL DEVICES

RTG POWDER DIFFRACTOMETER PANALYTICAL
RTG FLUORESCENCE ANALYSER SHIMADZU
ATOMIC ABSORPTION SPECTROMETER THERMO
ATOMIC ABSORPTION SPECTROMETER VARIAN
ATOMIC ABSORPTION SPECTROMETER CONTR AA

SIZE REDUCTION

SAMPLE DIVIDER
TWIN-SHAFT SHREDDER
FOUR-SHAFT SHREDDER
JAW CRUSHER
CUTTING MILL
HIGH SPEED CUTTING MILL
HAMMER MILL
BALL MILL
FRICTION MILL
DISC SWING MILL
HAMMER MILL ŠK600
HAMMER MILL ŠK300
SMALL HAMMER MILL
LABORATORY GRINDER
ULTRA-FINE MILL
HOMOGENIZER HKR-100
CRUSHER DKR-100

SIEVING AND SCREENING

CIRCULATE VIBRATORY SIEVE
ECO SEPARATOR GYRATORY SIFTER
LAB SIEVING TOWER

NON-MAGNETIC SEPARATION

BAND VIBRATING SEPARATOR
EDDY CURRENT SEPARATOR
SEPARATING TABLE



WET SHAKING TABLE

MAGNETIC SEPARATION

MAGNETIC SEPARATOR, LOW INTENSITY
MAGNETIC SEPARATOR, HIGH INTENSITY
MAGNETIC SEPARATOR, LOW INTENSITY

CONVEYING AND FEEDING

CONVEYOR BELT
CONVEYOR BELT
MAGAZINE WITH VIBRATING FEEDER

LEACHING

LEACHING KETTLE 3L
PILOT SCALE LEACHING LINE WITH 35L KETTLE
PILOT SCALE LEACHING LINE WITH 100L KETTLE

FILTRATION, EXHAUSTING

FILTRATION UNIT
MOBILE FILTERING EQUIPMENT
FILTER PRESS SHORT
FILTER PRESS MEDIUM

THERMAL TREATMENT

SMALL ELECTRIC LABORATORY FURNACE
ELECTRIC LABORATORY FURNACE
ROUND ELECTRIC FURNACE
HIGH TEMPERATURE VACUUM FURNACE
VACUUM EVAPORATOR
HOT AIR DRYING OVEN 100L
HOT AIR DRYING OVEN 200L



RTG POWDER DIFFRACTOMETER PANALYTICAL



Model/ manufactured	XPERT PRO RV-11 / 2010
Manufacturer	PANalytical
Size / type of particles	solid or powder samples
Type of analysis	X-ray diffraction – phase analysis
Active phys. properties	
Continuous/ Batch/ Single	batch
Lab/ Pilot/ Industry	Lab
Power consumption/ voltage	8,5kW / 400 V
Portability	no
Description	RTG powder diffractometer



RTG FLUORESCENCE ANALYSER SHIMADZU



Model/ manufactured	EDX-7000P
Manufacturer	Schimadzu
Type of analysis	X-ray fluorescence – element analysis
Active phys. properties	solid / liquid samples
Continuous/ Batch/ Single	batch
Labor/ pilot/ industry	laboratory
Power consumption/ voltage	200W, 230V
Portability	no
Description	RTG fluorescence analyzer



ATOMIC ABSORPTION SPECTROMETER THERMO



Model/ manufactured	ICE 3000
Manufacturer	Thermo scientific
Type of analysis	Atomic absorption spectroscopy – element analysis
Active phys. properties	liquid samples
Continuous/ Batch/ Single	single
Labor/ pilot/ industry	laboratory
Power consumption/ voltage	300VA, 230V
Portability	no
Description	atomic absorption spectrometer



ATOMIC ABSORPTION SPECTROMETER VARIAN



Model/ manufactured	SPECTR AA 20 PLUS
Manufacturer	VARIAN
Type of analysis	Atomic absorption spectroscopy - element analysis
Active phys. properties	liquid samples
Continuous/ Batch/ Single	single
Labor/ pilot/ industry	laboratory
Power consumption/ voltage	1200W,230V
Portability	no
Description	atomic absorption spectrometer



ATOMIC ABSORPTION SPECTROMETER CONTR AA



Model/ manufactured	ContrAA 700
Manufacturer	Analytik Jena AG
Type of analysis	Atomic absorption spectroscopy - element analysis
Active phys. properties	thermic
Continuous/ Batch/ Single	liquid samples
Labor/ pilot/ industry	single
Power consumption/ voltage	2100W, 230V
Portability	no
Description	atomic absorption spectrometer



SAMPLE DIVIDER



Model/ manufactured	RV-01 / 2007
Manufacturer	Spišcol, Ltd.
Grain size (input/output)	
Treatment type	homogenization of samples
Active phys. properties	
Continuous/ Batch/ Single	
Lab/ Pilot/ Industry	lab
Power consumption/ voltage	0,12 kW / 230 V
Portability	no
Description	preparation of representative samples



TWIN-SHAFT SHREDDER



Model	DR 120
Manufacturer	Častulík
Grain size (input/output)	300x350 mm chamber / ~10 mm
Treatment type	comminution, dry
Active phys. properties	size
Continuous/ Batch/ Single	continuous, batch
Lab/Pilot/Industry	lab/ pilot
Power consumption/ voltage	9 kW/ 400 V
Portability	no
Description	Twin-shaft shredder for disintegration of easily crushable objects
Output approx.	400 kg / hour



FOUR-SHAFT SHREDDER



Model	ARIES 120
Manufacturer	Častulik
Grain size (input/output)	400x350 mm chamber / ~10 mm
Treatment type	comminution, dry
Active phys. properties	size
Continuous/ Batch/ Single	continuous, batch
Lab/Pilot/Industry	lab/ pilot
Power consumption/ voltage	13,2 kW/ 400 V
Portability	no
Description	Powerful four-shaft shredder for disintegration of easily crushable objects when demanding smaller output fraction
Output approx.	600 kg / hour



JAW CRUSHER



Model	
Manufacturer	Vítkovice
Grain size (input/output)	>20 mm / <10 mm
Treatment type	comminution, dry
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	400 V
Portability	no
Description	



CUTTING MILL



Model	SM200
Manufacturer	Retsch
Grain size (input/output)	<60 mm / 0,25-20 mm
Treatment type	comminution, dry
Active phys. properties	size
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab/ pilot
Power consumption/ voltage	2,2 kW/ 400V
Portability	yes
Description	Cutting mill for soft, medium-hard, tough, elastic, fibrous materials



HIGH SPEED CUTTING MILL



Model/ manufactured	DP 11-240-350 /2005
Manufacturer	Profing, Ltd. Piešťany
Grain size (input/output)	200 mm / 4-40 mm
Treatment type	comminution of plastics
Active phys. properties	size
Continuous/ Batch/ Single	continuous
Lab/Pilot/Industry	lab
Power consumption/ voltage	11 kW/ 400V
Portability	no
Description	Shredding plastic foil, PET bottles and other materials like rubber, wood, paper and textile.
Output approx.	80 – 220 kg / hour



HAMMER MILL



Model/ manufactured	MK-380
Manufacturer	BMZ Slovakia, Inc.
Grain size (input/output)	max 50 mm / 0 – 2 mm
Treatment type	comminution, dry
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	5,5 kW/ 400V
Portability	no
Description	18 pinned hammers mill on carry frame for dry milling of soft, tack-free materials.



BALL MILL



Model	
Manufacturer	TUKE
Grain size (input/output)	
Treatment type	comminution, dry
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	400 V
Portability	no
Description	



FRICTION MILL



Model/ manufactured	ZTR TMR 2/ 1967
Manufacturer	
Grain size (input/output)	10 mm / dust
Treatment type	comminution, dry, wet
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	400 V
Portability	no
Description	



DISC SWING MILL



Model/ manufactured	1982
Manufacturer	OPS Přerov
Grain size (input/output)	150 mm / dust
Treatment type	comminution, dry
Active phys. properties	size
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab
Power consumption/ voltage	2kW/ 400V
Portability	yes
Description	Various grinding jars and rings. Fine and micro grinding for laboratory analysis.



HAMMER MILL ŠK600



Model/ manufactured	ŠK 600/ 2005
Manufacturer	ŠT Strojné zámočnictvo, Tužka Štefan
Grain size (input/output)	20 mm / 8 mm
Treatment type	comminution, dry
Active phys. properties	size
Continuous/ Batch/ Single	continuous, batch
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	7,2 kW / 400 V
Portability	yes
Description	Hammer mill with fast rotating hammers head. Materials: PCBs, wood, car plastics



HAMMER MILL ŠK300



Model	ŠK 300
Manufacturer	ŠT Strojné zámočníctvo, Tužka Štefan
Grain size (input/output)	15 mm / 5 mm
Treatment type	comminution, dry
Active phys. properties	size
Continuous/ Batch/ Single	continuous, batch
Lab/Pilot/Industry	lab
Power consumption/ voltage	4 kW / 400 V
Portability	yes
Description	Hammer mill with fast rotating hammers head. Materials: PCBs, wood, car plastics



SMALL HAMMER MILL



Model	22-5s3964
Manufacturer	WEBER
Grain size (input/output)	8-10 mm / 1-2 mm
Treatment type	comminution
Active phys. properties	size
Continuous/ Batch/ Single	continuous, batch
Lab/Pilot/Industry	lab
Power consumption/ voltage	230 V
Portability	yes
Description	Laboratory scale mill for materials such as waste electrical and electronic equipment, hard plastics, wood. Sieves are available for output of different fractions



LABORATORY GRINDER



Model	MF 10 micro
Manufacturer	IKA
Grain size (input/output)	10 mm / 0,25-5 mm
Treatment type	comminution
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab
Power consumption/ voltage	1 kW / 230 V
Portability	yes
Description	Laboratory-scale grinder with 2 different heads for materials with max feed hardness 6 Mohs.



ULTRA-FINE MILL



Model/ manufactured	MSZ 18/ 1985
Manufacturer	FRYMA Maschinen AG
Grain size (input/output)	1,1 dm ³ / 10nm
Treatment type	wet grinding
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	labor
Power consumption/ voltage	10kW/ 400 V
Portability	no
Description	Wet grinding of samples up to grain +10 nm



HOMOGENIZER HKR-100



Model/ manufactured	HKR-100
Manufacturer	SlovSETRA s.r.o
Grain size	1,5 – 6 mm
Treatment type	homogenization
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	pilot
Power consumption/ voltage	3kW/ 400 V
Portability	no
Description	Homogenization of granular material



CRUSHER DKR-100



Model/ manufactured	DKR-100
Manufacturer	SlovSetra s.r.o
Grain size (input/output)	10cm/2-6mm
Treatment type	conical rotation crushing
Active phys. properties	
Continuous/ Batch/ Single	continuous
Lab/Pilot/Industry	industry
Power consumption/ voltage	3kW/ 400 V
Portability	no
Description	Conical crusher for continuous crushing
Capacity	100kg/hour



CIRCULATE VIBRATORY SIEVE



Manufacturer	Heger
Grain size (input/output)	500x1000 / 1-2 mmm
Treatment type	separation, dry
Active phys. properties	size
Continuous/ Batch/ Single	continuous
Lab/Pilot/Industry	pilot
Power consumption/ voltage	0,2 kW/ 400 V
Weight	300-500 kg
Portability	no
Description	Circular Vibratory Screen for the determination of particle size distributions.



ECO SEPARATOR GYRATORY SIFTER



Model/ manufactured	No.31940/ 2015
Manufacturer	Russel
Grain size (input/output)	0-20 mm / 0-10mm
Treatment type	separation, wet, dry
Active phys. properties	
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab, pilot, industry
Power consumption/ voltage	400 V
Portability	no
Description	Current stage staple for use in almost every processing industry. Capable of separating wet or dry materials up to 5 fractions, fully stainless steel.



LAB SIEVING TOWER



Manufacturer	Stavební strojírenství Brno
Grain size	20 mm - 0,063 mm
Treatment type	separation, dry materials
Active phys. properties	size
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab
Power consumption/ voltage	0,18 kW / 230 V
Portability	yes
Description	Equipment for screen analysis according to STN



BAND VIBRATING SEPARATOR



Model	TAJFUN B 045.010
Manufacturer	Techcon s.r.o, Pribram CZ
Weight	217 kg
Power consumption/ voltage	0,75 kW / 400 V
Working surface width	450 mm
Working surface length	1000 mm
Description	Freely oscillating over-resonant vibrating separator, elliptic oscillation.
Function	Powdery or piece material separation on wire sieve.



EDDY CURRENT SEPARATOR



Model	SKR-240N
Manufacturer	EPA Prague, inc., Czech republic
Treatment type	separation
Active phys. properties	
Continuous/ Batch/ Single	batch, continuous
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	1,7 kW/ 400 V
Portability	No
Description	The mutual separation of granular materials based on whirling streams. Mutual separation of non-ferrous metals, iron and non-metallic materials.



SEPARATING TABLE



Model/ manufactured	TTS 300 - 100 - 1KV/ 2015
Manufacturer	TRENNSO TECHNIK
Grain size	
Treatment type	separation, dry materials
Active phys. properties	density
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	1 kW/ 400 V
Weight	600 kg
Portability	no
Description	Fluid separator with adjustable screen angle. The machine separates varying bulk materials according to their specific weight and shape.



WET SHAKING TABLE



Model	800 Laboratory
Manufacturer	Holman-Wilfley
Weight	220 kg
Power consumption/ voltage	0,37 - 3 kW / 230 V
Total size (W x L x H)	810 x 2315 x 1430 mm
Table decks size	640 x 1280 mm
Description	Two decks laboratory shaking table unit with self-lubricating head motion on adjustable frame feet.
Function	Recovery of precious metals (gold, silver etc.), characterization of heavy minerals, quality control
Output	Max 75 kg / hour



MAGNETIC SEPARATOR, LOW INTENSITY



Model/ manufactured	MOR 45131 MT 30A/ 2015
Manufacturer	Steinert
Treatment type	separation, dry materials
Active phys. properties	0,16 T
Continuous/ Batch/ Single	
Lab/Pilot/Industry	pilot
Power consumption/ voltage	1kW / 400 V
Weight	700 kg
Size (diameter x lenght)	(300 v 500 mm)
Portability	no
Description	Ferrite permanent magnets Separation of strong magnetic substances
Output approx.	160 kg / hour



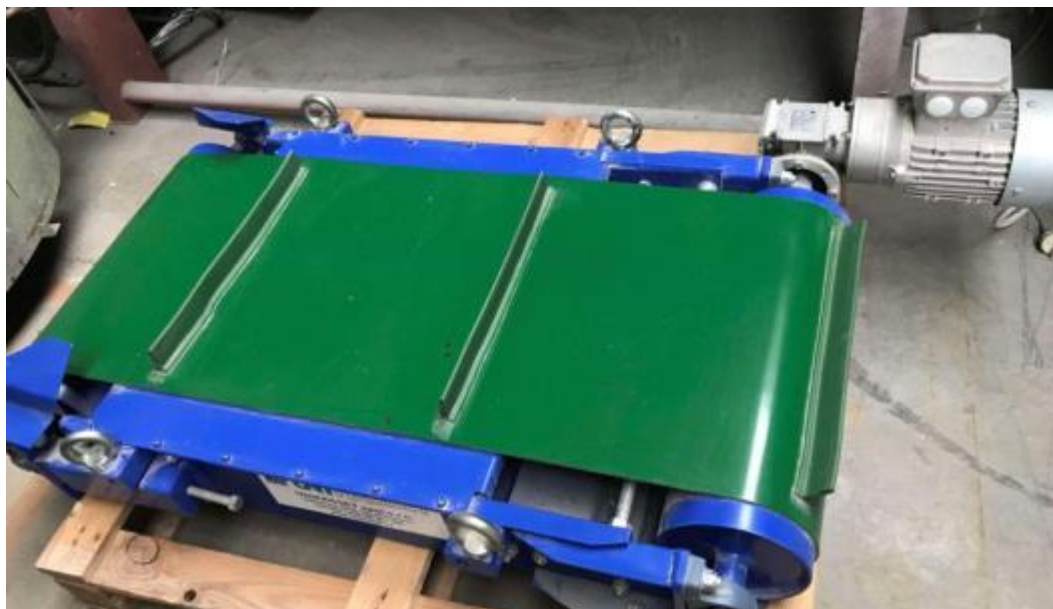
MAGNETIC SEPARATOR, HIGH INTENSITY



Model	B-400-3000 MGS
Manufacturer	Techkon, Ltd.
Treatment type	separation, dry materials
Active phys. properties	0,16 T
Continuous/ Batch/ Single	
Lab/Pilot/Industry	pilot
Power consumption/ voltage	1,1 kW / 400 V
Weight	250 kg
Working surface	400 mm x 3000 mm
Portability	no
Description	Neodymium permanent magnets Separation of weak magnetic substances
Function	Powdery or piece material
Output approx.	600 kg / hour



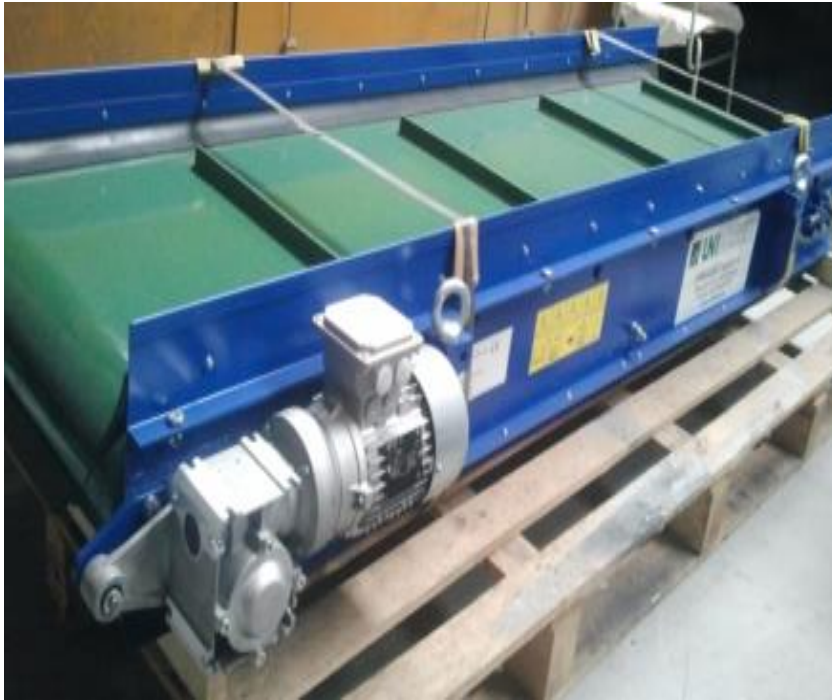
MAGNETIC SEPARATOR, LOW INTENSITY



Model	SPUC 450/ 2014
Manufacturer	UNIKASSET, Ltd. Ostrava, Czech republic
Treatment type	dry, wet materials
Active phys. properties	0.16 T
Continuous/ Batch/ Single	continuous
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	0,55 kW/ 400 V
Weight	230 kg
Portability	no
Description	Ferrite permanent magnets Separation of strong magnetic substances
Output approx.	160 kg / hour



CONVEYOR BELT



Model	UDPP 837/ 2014
Manufacturer	UNIKASSET, Ltd. Ostrava, Czech republic
Treatment type	dry, wet materials
Continuous/ Batch/ Single	continuous
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	0,43 kW/ 400 V
Portability	no
Description	Rubber conveyor belt for magnetic separator.



CONVEYOR BELT



Model	B-400-3000
Manufacturer	Spišcol, Ltd.
Weight	250 kg
Power consumption/ voltage	1,1 kW / 400 V
Working surface width	400 mm
Working surface length	3000 mm
Description	Conveyor belt
Function	Continuous or interrupted transport of powder or piece materials.



MAGAZINE WITH VIBRATING FEEDER



Model	VZP 040.009 Z
Manufacturer	Techkon, Ltd.
Weight	144 kg
Power consumption/ voltage	2x0,37 kW / 400 V
Working surface width	400 mm
Working surface length	900 mm
Description	Freely oscillating, resonant vibratory feeder with conveyor.
Function	Continuous or interrupted transport of powder or piece materials.



LEACHING KETTLE 3L



Manufacturer	KGW ISOTHERM
Treatment type	
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab
Power consumption/ voltage	230 V
Portability	no
Description	Double wall 3 L glass leaching kettle with thermoregulation and stirring mechanism.



PILOT SCALE LEACHING LINE WITH 35L KETTLE



Manufacturer	
Treatment type	
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	pilot
Power consumption/ voltage	400 V – stirring, heating
Portability	no
Description	pilot scale leaching line



PILOT SCALE LEACHING LINE WITH 100L KETTLE



Manufacturer	
Treatment type	
Active phys. properties	
Continuous/ Batch/ Single	
Lab/Pilot/Industry	pilot
Power consumption/ voltage	400 V – stirring, heating
Portability	no
Description	pilot scale leaching line



FILTRATION UNIT



Model	EKOVENT PF 1.0 v01.2017
Manufacturer	Elektrotechnika Filter, Ltd.
Weight	160 kg
Power consumption/ voltage	0,75 kW / 400 V
Filtration surface	10 m ²
Total size (W x L x H)	900 x 700 x 1950 mm
Description	Industrial filtration unit of modular construction
Function	Extraction and filtration of dust or aerosol air pollution in a non-explosive environment



MOBILE FILTERING EQUIPMENT



Model/ manufactured	DC350CF
Manufacturer	Bernardo GmbH, Austria
Capacity	2800 m ³ /h
Waste bag volume	200 l
Continuous/ Batch/ Single	continuous, batch
Lab/Pilot/Industry	lab, pilot
Weight	47 kg
Power consumption/ voltage	2,1 kW / 400 V
Portability	yes
Description	Dust particles effective filtration through by cartridge filter, mobile collector on wheel board, constant extraction force.



FILTER PRESS SHORT



Model/ manufactured	300/3-00-20/ 2015
Manufacturer	ANTARES Přerov, Czech republic
Treatment type	wet
Active phys. properties	moisture
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	pilot
Weight	165 kg
Portability	yes
Description	Filter press used with leaching kettles (16l and 100l). Suitable for thick sludges and mud.



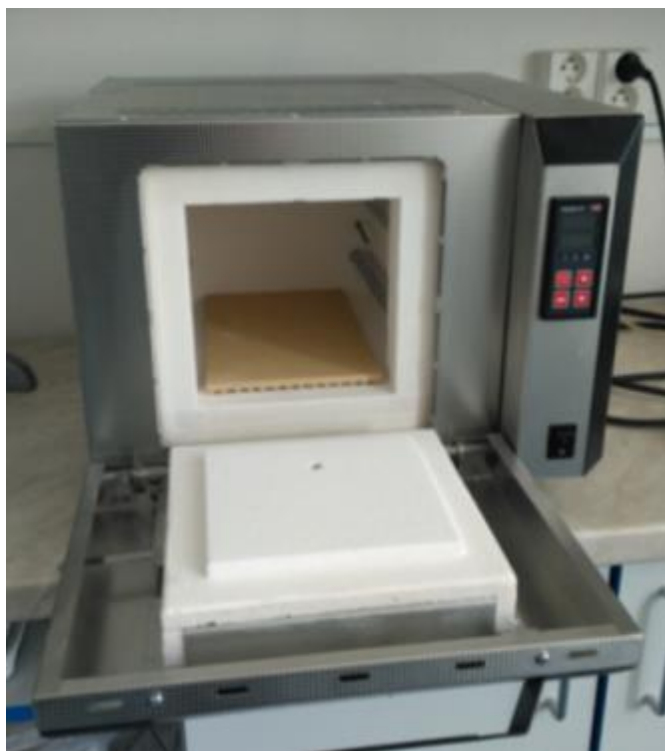
FILTER PRESS MEDIUM



Model/ manufactured	AXHR 300 LÁB/ 2013
Manufacturer	ANTARES Přerov, Czech republic
Treatment type	wet
Active phys. properties	moisture
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	pilot
Weight	200 kg
Portability	yes
Description	Filter press used with leaching kettles (16l and 100l). Suitable for thick sludges and mud.



SMALL ELECTRIC LABORATORY FURNACE



Model	Ht40 P
Manufacturer	LAC, Ltd. BRNO, Czech republic
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab
Power consumption/ voltage	2,3 kW/ 230 V
Portability	yes
Description	Manually-controlled furnace for temperatures up to 800°C



ELECTRIC LABORATORY FURNACE



Model	
Manufacturer	
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab
Power consumption/ voltage	
Portability	no
Description	Manually-controlled furnace for temperatures up to 800°C



ROUND ELECTRIC FURNACE



Model	
Manufacturer	
Active phys. properties	
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	400V
Portability	yes
Description	Top feed furnace for temperatures up to 1200°C.



HIGH TEMPERATURE VACUUM FURNACE



Model/ manufactured	HT VAC 1600
Manufacturer	LINN
Active phys. properties	temperature
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	400V
Portability	no
Description	Vacuum furnace for temperatures up to 1600°C.



VACUUM EVAPORATOR



Model/ manufactured	Normi Vacuum / 2017
Manufacturer	Normit
Volume	100 L
Continuous/ Batch/ Single	batch
Lab/Pilot/Industry	lab, pilot
Power consumption/ voltage	9,12 kW / 400V
Portability	no
Description	Closed cylindrical tank composed of inner pot and outer cover with electric heating and stirring.



HOT AIR DRYING OVEN 100L



Model/ manufactured	HS122A / 1982
Manufacturer	Chirana Brno
Volume	100 L
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab
Power consumption/ voltage	2 kW / 230V
Portability	no
Description	Laboratory hot air oven



HOT AIR DRYING OVEN 200L



Model/ manufactured	HS202A / 1978
Manufacturer	Chirana Brno
Volume	200 L
Continuous/ Batch/ Single	
Lab/Pilot/Industry	lab
Power consumption/ voltage	2,4 kW / 230V
Portability	no
Description	Laboratory hot air oven