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PETRODIST ®

Crude oil distillation systems according to ASTM - standards
for fractionation and boiling analysis

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1.Distillation according to ASTM D-2892 (TBP)

1.1 PETRODIST 100 M

Crude oil distillation system for **manual operation** exactly according to ASTM D-2892 (TBP). Basic system, ideal for teaching purposes in universities or crude oil laboratories.

The system is designed for possible future upgrade to a semi-automatic system (PETRODIST 100 S) and is capable to perform all of the following distillation runs by manual control:

- Debutanization
- 1. run at atmospheric pressure
- 2. run at vacuum 100 Torr
- 3. run at vacuum 10 Torr
- 4. run at vacuum 2 Torr

After each run, the system stops automatically and the flask temperature has to be cooled down prior to the next distillation run. The operator has to enter the parameters for the next run to restart operation. The system contains 1 distillate receiver, which has to be replaced for each fraction.

Key features:

- basis system, can be upgraded
- microprocessor controlled, based on multifunctional serial bus system
- PC with windows based operation and evaluation software
- flask heater control by differential temperature, differential pressure, power regulation or preselected fixed temperature
- continuous monitoring of distillation process
- all distillation parameters can be exactly and reproducibly selected
- debutanization process manually
- cooling down process manually after each run
- precise vacuum control

Option

Stainless steel flask
Upgrade with fraction collector

Technical data

Flask Sizes:	1, 4, 6, 10, 20 L or upon request
Flask Charge:	between 30 and 60 % of flask volume
Operating temperature:	up to 420° C
Operation pressure:	atmospheric down to vacuum 1 Torr
Final cut temperature:	up to 400°/420° C AET (750° F)
Max. ambient temperature:	25° - 30 °C
Mains supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d):	depending on flask size

The system consists of:

1 system basis for the assembly of all parts, with mounting frame, equipped with all system specific electric, mechanic and hydropneumatic control elements, as well as lifting platform for the isomantle heating bath, including all necessary holders and fastenings

1 isomantle heating bath for flask with temperature sensor Pt-100 and integrated stirrer drive, insulation jacket for the upper half of the flask,

2 distillation flasks, made of glass, with connecting nozzle for temperature sensor, pressure drop measurement and nitrogen bleed, flask temperature sensor with integrated quench coil, made of stainless steel

1 distillate cooler

1 distillation column, 15 theoretical plates, including take-off divider in the liquid phase with silvered high-vacuum mantle. Complete with packing, Propak 316, solenoid coil for the take-off divider, with head temperature sensor Pt-100 with NS 14.5 cone, immersion depth 60 mm

1 column heating mantle for adiabatic operation, with built-in temperature sensor

1 main condenser, with vacuum mantle, made of glass,

1 final receiver

1 vacuum probe, independent of the kind of gas with stainless steel diaphragm, range 100.0-0.1 Torr (other ranges upon request),

1 cryo-vac-station equipped with:

- 1 vacuum pump, 2-stages 12 m³/h, with throttle- and solenoid valves for vacuum stabilisation
- 2 vacuum cold traps with Dewar vessels for protection of the pump
- 1 gas trap for the debutanization, made of glass with 2 stop isolating valves
- 1 cryostat for supply of the main condenser and for cooling the distillate cooler and the fraction collector

1 distillation control unit DCD4001

universal computer-controlled device for PILODIST distillation systems as well as for an upgrade of existing distillation systems. The unit is designed for operation and control of temperature, vacuum, reflux divider, limit and alarm system as well as fraction collector. The service area is password protected and provides tools to change the controller settings. It also provides tools for the calibration of vacuum- and temperature sensors. All actual parameters are displayed continuously as a graphical trend (curves) during the distillation process to inform the operator about the actual status. The control system is based on a multifunctional serial bus system, connected to a PC with our new and most modern windows based operation software.

The DCD 4001 is delivered with the operation software, a PC and the interface box as central connection point for all sensors.

1.2 PETRODIST 100 S

PETRODIST® 100 S



Crude oil distillation system for **semi-automatic operation** exactly according to ASTM D-2892 (TBP)

The system is designed for automatic operation within each of the following distillation runs:

- Debutanization
- 1. run at athmospheric pressure
- 2. run at vacuum 100 Torr
- 3. run at vacuum 10 Torr
- 4. run at vacuum 2 Torr

After each run, the system stops automatically and the flask temperature has to be cooled down prior to the next distillation run. The operator has to enter the parameters for the next run to restart operation. The system contains a vacuum tight automatic fraction collector with 9 receivers for each run, which have to be replaced after each distillation run. The receiver change is performed according to pre-selected boiling temperature or when a receiver is filled up.

Key features:

- microprocessor controlled, based on multifunctional serial bus system
- PC with windows based operation and evaluation software
- continuous monitoring of distillation process
- continuous report and data storage
- flask heater control by differential temperature, differential pressure, power regulation or preselected fixed temperature
- all distillation parameters can be exactly and reproducibly selected
- automatic receiver change by preselected cut temperatures
- debutanization process manually
- cooling down process manually after each run
- precise vacuum control

Options

stainless steel flask
immersion cooler for vacuum cold traps and gas trap

Technical data

Flask Sizes:	1, 4, 6, 10, 20 L or upon request
Flask Charge:	between 30 and 60 % of flask volume
Operating temperature:	up to 420° C
Operation pressure:	atmospheric down to vacuum 1 Torr
Final cut temperature:	up to 400°/420° C AET
Fraction collector:	9 receivers 250 mL each
Max. ambient temperature:	25° - 30 °C
Mains supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d):	depending on flask volume

The system consists of:

1 system basis for the assembly of all parts, with mounting frame, equipped with all system specific electric, mechanic and hydropneumatic control elements, as well as lifting platform for the isomantle heating bath, including all necessary holders and fastenings

1 isomantle heating bath for flask with temperature sensor Pt-100 and integrated stirrer drive, insulation jacket for the upper half of the flask, including temperature sensor

2 distillation flasks, made of glass, with connecting nozzle for temperature sensor, pressure drop measurement and nitrogen bleed, flask temperature sensor with integrated quench coil, made of stainless steel

1 vacuum-tight fraction collector for automatic operation for 9 receivers, 250 mL each, with light barrier for over-charge protection,

1 distillation column, 15 theoretical plates, including take-off divider in the liquid phase with silvered high-vacuum mantle. Complete with packing, Propak 316, solenoid coil for the take-off divider, with head temperature sensor Pt-100 with NS 14.5 cone, immersion depth 60 mm

1 column heating mantle for adiabatic operation, with built-in temperature sensor

1 main condenser, with vacuum mantle, made of glass

1 distillate cooler, intermediate receiver 250 ml, with cooling mantle and vacuum mantle

1 pressure drop sensor with protective cooler

1 vacuum probe, independent of the kind of gas with stainless steel diaphragm, range 100.0-0.1 Torr (other ranges upon request),

1 cryo-vac-station equipped with:

1 vacuum pump, 2-stages 12 m³/h, with throttle- and solenoid valves for vacuum stabilisation
2 vacuum cold traps with Dewar vessels for protection of the pump
1 gas trap for the debutanization, made of glass with 2 stop isolating valves
1 cryostat for supply of the main condenser and for cooling the distillate cooler and the fraction collector

1 set of sealings, lines, connections, small parts and accessories

1 distillation control unit DCD4001

universal computer-controlled device for PILODIST distillation systems as well as for an upgrade of existing distillation systems. The unit is designed for operation and control of temperature, vacuum, reflux divider, limit and alarm system as well as fraction collector. The service area is password protected and provides tools to change the controller settings. It also provides tools for the calibration of vacuum- and temperature sensors. All actual parameters are displayed continuously as a graphical trend (curves) during the distillation process to inform the operator about the actual status. The control system is based on a multifunctional serial bus system, connected to a PC with our new and most modern windows based operation software.

The DCD 4001 is delivered with the operation software, a PC and the interface box as central connection point for all sensors.

1.3 PETRODIST 100 CC

PETRODIST® 100 CC



Processor controlled crude oil distillation system for fully automatic, unattended operation exactly according to ASTM D-2892 (TBP).

The system is computer controlled and designed for fully automatic operation throughout the different distillation runs at different pressure levels which includes:

- Debutanization
- 1. run at athmospheric pressure
- 2. run at vacuum 100 Torr
- 3. run at vacuum 10 Torr
- 4. run at vacuum 2 Torr

These different distillation runs are performed automatically without any intervention from the operator. The individual fractions are being collected in an inbuilt balance receiver with online distillate high precision weight measuring and online volume detection prior to the discharge from the system into the automatic fraction collector, which operates with 20 septum-sealed receivers. The receiver change is performed according to pre-selected boiling temperature or when a receiver is filled up.
Due to the fully automatic uninterrupted operation the complete distillation procedure takes only a period of approx. 10 hours, depending on the individual crude oil charge.
After the distillation the operator has to determine the weight from the gas trap as well as the flask residue by an external balance, enter the weights and as a result the final datas and TBP-curve are printed out.

The system requires water, nitrogen, compressed air and electricity.

Key features:

- Computer controlled fully automatic process without any interruption
- PC with windows based operation and evaluation software
- continuous monitoring of distillation process and data storage
- boil-up rate controlled by differential temperature, differential pressure, power regulation and distillate weight
- all distillation parameters can be exactly and reproducibly selected
- fraction and receiver changes are performed acc. to preselected cut temp.
- fully automatic product discharge into sealed final receivers without any influence on the distillation process
- automatic debutanization process
- adiabatic operation due to column heating jacket
- reduced cooling period between runs by using a quench cooler
- cooling down process after each run automatically
- precise vacuum control
- electrical lifting platform for flask
- evaluation of the "final data" and printout of TBP-curve in Microsoft Excel
- several safety and alarm options available
- options for water removal and sheeting of the system available
- automatic online weight **and** volume measuring

Technical data

Flask sizes:	1, 4, 6, 10, 20 L or upon request

Flask charge:	between 30 and 60 % of flask volume
Operating temperature:	up to 350° C (420° C AET)
Operating pressure:	atmospheric down to vacuum 1 Torr
Fraction collector:	20 septum sealed receivers, 1 L each
Max. ambient temperature:	25° - 30 °C
Mains supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d):	depending on flask volume

The system consists of:

1 system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control elements, as well as electrical lifting platform for the insulating mantle heating bath, including all necessary holders and fastenings

1 heating bath for flask with insulating mantle, with temperature sensor Pt-100 and integrated stirrer drive, insulation jacket for the upper half of the flask, including temp. sensor

2 distillation flasks, made of glass, with connecting nozzle for temperature sensor, pressure drop measurement and N_2-bleed, with 1 flask temperature sensor with 1 quench cooler, made of stainless steel

1 distillation column 15 theoretical plates, including take off divider in the liquid phase with silvered high – vacuum mantle. Complete with packing Propak 316, solenoid coil for the take off divider, with head temperature sensor Pt-100 with NS 14.5 cone, immersion depth 60 mm

1 column heating mantle for adiabatic operation, with built-in temperature sensor,

1 glass main condenser with vacuum mantle,

1 distillate cooler with vacuum mantle

1 distillate weighing system with electronic precision balance for continuous recording of fraction weights under vacuum, with balance receiver 1000 mL

1 discharge system with blockpot (intermediate receiver), including online volume measurement, pneumatic valves and syringe system

1 fraction collector with 20 receivers, 1000 mL each, sealed with septa

1 pressure drop sensor with protective cooler

1 vacuum probe, independent of the kind of gas, with stainless steel diaphragm, range 100.0-0.1 Torr (other ranges upon request)

1 cryo-vac station, equipped with:
- 1 vacuum pump, 2-stages 12 m³/h, with throttle- and solenoid valves for vacuum stabilisation
- 2 vacuum cold traps with Dewar vessels for protection of the pump
- 1 gas trap (pressure-proof up to 3 bar),isolating valves & Dewar vessel
- 1 cryostat for cooling of the main condenser and for cooling of the peripheral parts

1 Control and Evaluation Station PD100CC
The control system is based on a multifunctional serial bus system integrated into the system basis and connected to a PC with windows based operation software.
The software allows a comfortable overview and input of all parameters, as well as the automatic creation of the final data tables and curves. All Parameters can be changed during the operation process and saved and recalled at any time. The final data tables and curves will be created automatically in Microsoft Excel.
The password protected service area gives the user an easy possibility to do calibration and maintenance work.

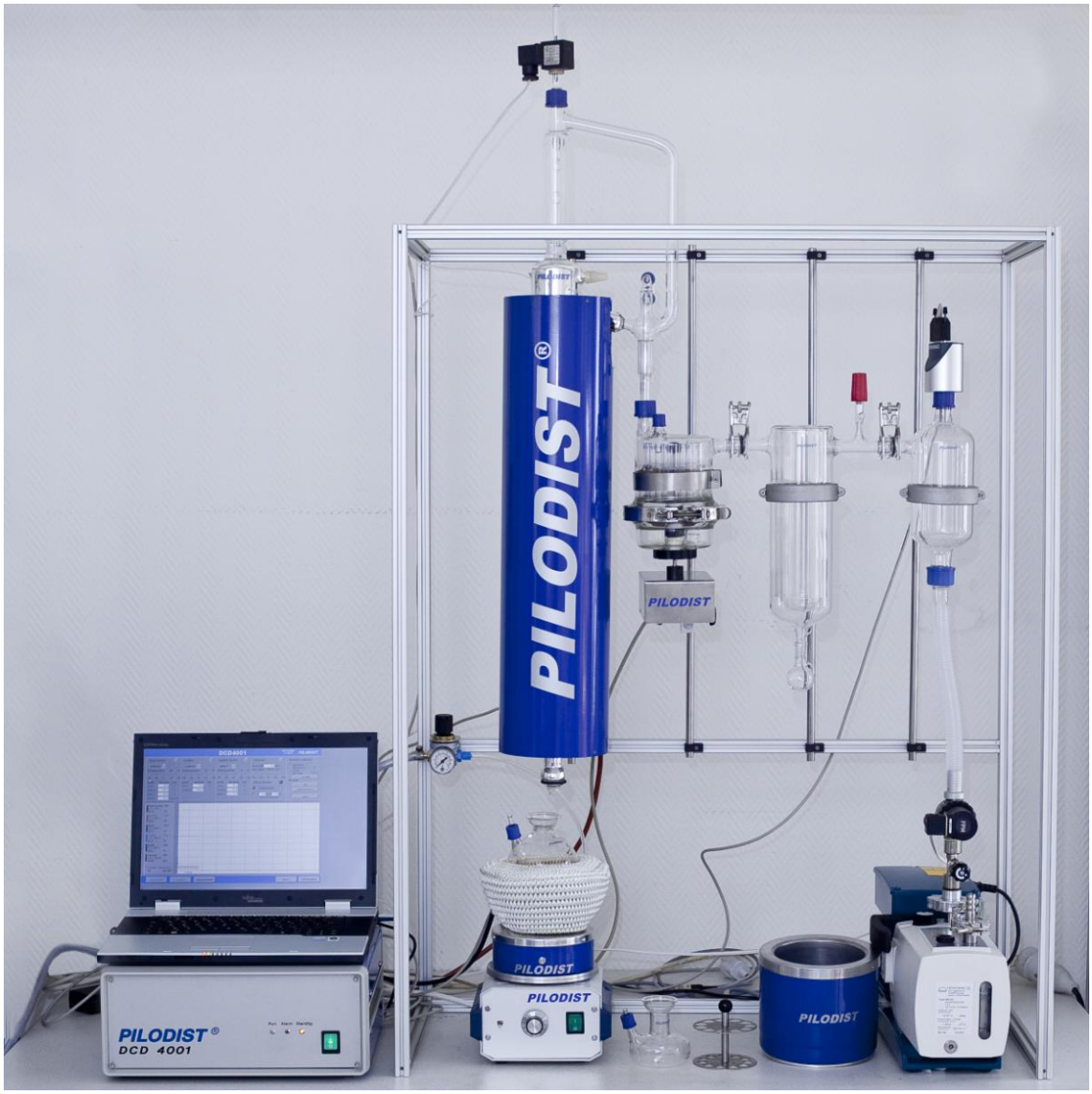
1 personal computer with TFT monitor and printer
1 electronic precision balance
1 system specific operation software and safety devices

Available options:
water removal
stainless steel flask
protective sheathing of the system
gas detector
fire extinguisher
UPS system
immersion cooler for vacuum cold traps and as trap

2. Quick distillation of small crude oil charges

similar to ASTM D-2892

PETRODIST® 500 Q (Quickdist)



PETRODIST 500 Q

- bench scale crude oil distillation system for semi-automatic operation
- quick distillation of small crude oil charges
- approx. 2 hrs. for complete distillation (depending on crude oil)
- manual fraction collector (optional automatic operation)
- operation stages following ASTM D-2892: ATM, 100 Torr, 10 Torr, 2 Torr
- column efficiency similar ASTM D-2892 approx. 15 th. plates

Technical Data

Charge Quantity:	100 - 350 mL
Operation Temperature:	Up to 350° C (AET 420°C)
Operating Pressure:	down to 1 Torr
Mains Supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d):	1.20 x 1.50 x 0.50 m
Weight:	Approx. 80 kg

The unit consists of:

1	assembly unit with all necessary holders
1	distillation column, DN 18, approx. 15 th. Plates, packed height 480 mm, including take-off divider in the liquid phase with silvered high-vacuum mantle. Column with integrated main condenser and distillate cooler, complete with packing, Propak 316, 4 mm, solenoid coil for the take-off divider, with head temperature sensor Pt-100
1	isomantle heating bath for 500 mL flask with temperature sensor Pt-100 and integrated stirrer drive, insulation jacket for the upper half of the flask,
1	distillation flask 500 mL
1	tower mantle with integrated Pt-100, for control and display
1	manual fraction collector with 22 x 3 ml receivers and additional fraction collector insert with 11 x 12 ml receivers
1	vacuum pump, 2-stage, 8 m3/h
1	vacuum cold trap
1	buffer vessel

1 connecting piece made of glass, buffer vessel / pump

1 vacuum measuring probe 100-0.1 Torr

1 vacuum solenoid valve with throttle valve,

1 distillation control unit DCD4001

universal computer-controlled device for PILODIST distillation systems as well as for an upgrade of existing distillation systems. The unit is designed for operation and control of temperature, vacuum, reflux divider, limit and alarm system as well as fraction collector. The service area is password protected and provides tools to change the controller settings. It also provides tools for the calibration of vacuum- and temperature sensors. All actual parameters are displayed continuously as a graphical trend (curves) during the distillation process to inform the operator about the actual status. The control system is based on a multifunctional serial bus system, connected to a PC with our new and most modern windows based operation software.

The DCD 4001 is delivered with the operation software, a PC and the interface box as central connection point for all sensors.

3.Distillation according to ASTM D-5236 (Potstill)

3.1 PETRODIST 200 S

PETRODIST® 200 S



Crude oil distillation system for semi automatic operation according to ASTM D-5236 (Standard Test Method for Distillation of heavy Hydrocarbon Mixtures, Vacuum Potstill Method).

The system is designed to continue the distillation with the residue of ASTM D-2892 distillation at reduced pressures ranging from 1 Torr down to 0,1 Torr

The cuts are taken automatically according to the pre-selected boiling temperature or when the receivers are filled up. The vacuum tight fraction collector contains 9 receivers, their volume is depending to the flask size.

The control of the flask heating ensues either isothermally or according to the temperature difference between heating bath and flask. Thus an operation according to distillation rate is possible.

Key features:

- microprocessor controlled, based on multifunctional serial bus system
- PC with windows based operation and evaluation software
- continuous monitoring of distillation process
- continuous report and data storage
- boil-up rate controlled by differential temperature,
- all distillation parameters can be exactly and reproducibly selected
- automatic receiver change by preselected cut temperatures
- cooling down process manually after each run
- precise vacuum control

Option

Stainless steel flask

Technical Data

Flask size:	1, 2, 4, 6, 10, 20 L
Flask charge:	between 30 and 60 % of flask volume
Receiver capacity:	9 , volume depending on flask size
Operation temperature:	up to 400° C (650 ° C AET)
Operation pressure:	vacuum down to 0.1 Torr
Max. ambient temperature:	25° - 30°C
Mains supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d):	depending on flask volume

The system consists of:

1 system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control elements, as well as lifting platform for the insulating mantle heating bath, including all necessary holders and fastenings

1 heating bath with insulating mantle for flask with temperature sensor Pt-100 and integrated stirrer drive, insulation jacket for the upper half of the flask,

2 distillation flasks, made of glass, with connecting nozzle for temperature sensor, with 1 flask temperature sensor with 1 ss quench cooler,

1 distillation head DN 36, 2 entrainment separators with silvered high-vacuum mantle. Product cooler and condenser are melted with head. Head temp.sensor Pt 100, protective cooler for the vacuum cooler

1 column heating mantle for adiabatic operation, with built-in temp. sensor

1 vacuum-tight fraction collector for automatic operation with 9 receivers, with light barrier to protect overfilling,

1 vacuum probe, independent of the kind of gas, with stainless steel diaphragm, range 10.0-0.01 Torr (other ranges upon request)

1 vacuum cold trap to protect the vacuum pump, including Dewar vessel

1 vacuum pump, 2 stages, 18 m^3/h, complete with oil filling and vacuum control device with solenoid control valve and throttle servo-valve

1 compact thermostat, operation range up to 150°C

1 distillation control unit DCD4001

universal computer-controlled device for PILODIST distillation systems as well as for an upgrade of existing distillation systems. The unit is designed for operation and control of temperature, vacuum, reflux divider, limit and alarm system as well as fraction collector. The service area is password protected and provides tools to change the controller settings. It also provides tools for the calibration of vacuum- and temperature sensors. All actual parameters are displayed continuously as a graphical trend (curves) during the distillation process to inform the operator about the actual status. The control system is based on a multifunctional serial bus system, connected to a PC with our new and most modern windows based operation software.
The DCD 4001 is delivered with the operation software, a PC and the

interface box as central connection point for all sensors.

3.2 PETRODIST® 200 CC

PETRODIST® 200 CC



Processor controlled fully automatic system for the fractionation of crude oil residues or high boiling components according to ASTM D-5236 (Potstill). This system continues the distillation with the residue from ASTM D-2892.

The system is computer controlled and designed for fully automatic operation for the fractionation of crude oil residues and higher boiling components to be performed throughout the vacuum distillation procedure ranging from 1 Torr down till 0,1 Torr. The boil-up rate is controlled according to a pre-selectable distillation rate in ml/min. As a fully automatic system it provides a vacuum reduction process in accordance with the ASTM regulation, which is initiated when a preselectable flask temperature (e.g. 300° C) is reached. The required parameters for the automatic vacuum reduction process are calculated and adjusted automatically by the system according to the actual process parameters. This procedure ensures an uninterrupted and continued procedure and shortens the duration of the whole process down to a minimum time, depending on product and set cut temperatures.

The automatic fraction collector is equipped with 12 receivers and provides IR-heating of the actual receiver in use. It is also equipped with an automatic online volume follower system to measure the volume of each fraction and to determine the distillation rate as well as an online weight measurement. To avoid overfilling the fraction collector turns to the next receiver when a certain level in a receiver is reached.

The volume calculation is expressed as percentage corresponding to the weight and the volume of the flask charge. The distillation curve is printed out in weight- and volume-percent.

The system requires water, nitrogen and air.

Key features:

- Computer controlled fully automatic process without any interruption
- PC with windows based operation and evaluation software
- continuous monitoring of distillation process and data storage
- automatic and receiver changes to be determined by presselected cut temperature and/or receiver volume
- fully automatic product discharge without any influence on the distillation process
- adiabatic operation due to column heating jacket
- cooling down process after the distillation run automatically
- electrically driven lifting platform for flask heating
- precise vacuum control and automatic vacuum reduction process
- evaluation of the "final data" and printout of TBP-curve
- several safety and alarm options available
- automatic online volume **and** weight measurement

Technical data

Flask size:	3, 6 10, 20 L or upon request
Flask charge:	between 30 and 60 % of falsk volume
Operating temperature:	up to 420° C (650° C AET)
Operation pressure:	vacuum down to 0.1 Torr
Fraction collector:	12 receivers, volume depending on flask size
Max. Ambient Temperature:	25° - 30°C
Mains Supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d):	depending on flask size

The system consists of:

1 system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control elements, as well as lifting platform for the insulating mantle heating bath, including all necessary holders and fastenings

1 heating bath with insulating mantle for flask with temperature sensor Pt-100, integrated stirrer drive and air cooling, insulation jacket for the upper half of the flask, including temperature sensor

2 distillation flasks, made of glass, with connecting nozzle for temperature sensor, with 1 flask temperature sensor with 1 quench cooler, made of stainless steel

1 distillation head, DN 36, 2 entrainment separators with silvered high-vacuum mantle. Product cooler and condenser are melted to the head. Head temperature sensor Pt-100, length 220 mm, protective cooler for the vacuum probe

1 column heating mantle for adiabatic operation, with built-in temp. sensor

1 vacuum-tight fraction collector for automatic operation, with 12 receivers with volume follower system, electronic balance and IR-heater for the receivers,

1 vacuum probe, independent of the kind of gas, with stainless steel diaphragm, temperature stabilised, range 10.0-0.01 Torr (other ranges upon request)

1 vacuum cold trap for protection of the vacuum pump, including Dewar

vessel

1 vacuum pump, 2-stages, 18 m³/h, complete with oil filling and vacuum control device with solenoid control valve and throttle servo-valve and bypass valve

1 compact thermostat, operation range –30° to +150°C,

1 Control and Evaluation Station PD 200 CC
The control system is based on a multifunctional serial bus system integrated into the system basis and connected to a PC with windows based operation software.
The software allows a comfortable overview and input of all parameters, as well as the automatic creation of the final data tables and curves. All Parameters can be changed during the operation process and saved and recalled at any time. The final data tables and curves will be created automatically in Microsoft Excel.
The password protected service area gives the user an easy possibility to do calibration and maintenance work.

1 System specific operation software and safety devices.

1 personal computer with TFT monitor and printer
1 electronic precision balance
1 system specific operation and evaluation software

Available Options:
Stainless Steel Flask
Protective Sheathing of the System
Fire Extinguisher
UPS-System

4. Combined systems

4.1 PETRODIST 400 A

PETRODIST® 400 A



Processor controlled and combined crude oil distillation system for automatic operation according to **ASTM D-2892 (TBP) and ASTM D-5236 (Potstill)**

PETRODIST 400 A is a combination of the basic systems

* PETRODIST 100 S
* PETRODIST 200 CC

One of both systems can be operated at a time. The system enables to perform TBP- and Potstill - distillations of various crude samples according to ASTM-standards and is designed for laboratory use.

The system is equipped with a central computer control, vaccum supply and thermostate system, data storage and evaluation station as well as a fraction collector, designed to serve for both distillation systems alternatively and provides direct automatic distillation flow rate control.

The fraction/receiver changes are automatically performed according to preselected cut temperatures or in case of receiver overfilling. The fraction collector is equipped with 12 receivers. The final data and the TBP-curve in wt% and vol% are printed out after reweighing the residue.

The distillation acc. to ASTM D-5236 is fully automatic without any interruption from the beginning till the complete termination of the distillation. The system part for distillation acc. to ASTM D-2892 needs a change of receivers after each of the different pressure runs due to the design of the fraction collector to serve for both distillation systems.

The unit requires water, nitrogen, compressed air and electricity. Dry ice or liquid nitrogen is required for cold traps.

Technical Data

Equipment for ASTM D-2892

Flask size:	1, 4, 6, 10 or 20 L
Flask charge:	30 – 60 % of flask size
Operation temperature:	Up to 350° C

Operation pressure:	Vacuum down to 1 Torr
Final cut temperature:	Up to 400° C AET (750° F)

Equipment for ASTM D-5236

Flask size:	3, 6, 10, 20 L
Flask charge:	30 – 60 % of flask charge
Operation temperature:	up to 400° C
Operation pressure:	vacuum down to 0.1 Torr
Final cut temperature:	up to 650° C AET

Common equipment specification

Fraction collector:	12 receivers x 500 ml
Power consumption:	8000 W (without options)
Max. ambient temperature:	25° C
Main supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d) (approx.):	2.30 x 2,80 x 0.90 m

Equipment according to ASTM D-2892

1 electrical flask heating mantle (2400 W), with temperature sensor Pt-100, and integrated stirrer drive, insulation jacket for the upper half of the flask l, including temperature sensor Pt-100

2 distillation flasks, made of glass with connectors for temperature sensor, pressure drop measurement and N_2-bleed, incl. 1 flask temperature sensor Pt-100 with integrated quench coil, stainless steel

1 ASTM-distillation column, with silvered high-vacuum mantle, including reflux

divider in the liquid phase. Complete with packing Propak 316, separation efficiency approx. 15 theoretical plates, with solenoid coil for the reflux divider. The column dimensions are conforming to the flask size according to the ASTM-standard!!

1 tower heating mantle for adiabatic operation, with temp. sensor Pt-100

1 main condenser with vacuum mantle, made of glass

1 distillate cooler with vacuum mantle

1 pressure drop sensor with safety cooler

1 vacuum sensor, with stainless steel diaphragm, range 100.0-0.1 Torr (other ranges upon request)

Equipment according to ASTM D-5236

1 electrical flask heating mantle (2000 W), with temperature sensor Pt-100, and integrated stirrer drive, insulation jacket for the upper half of the flask, including temperature sensor Pt-100

2 distillation flasks, made of glass, with connector for temperature sensor, incl. 1 flask temperature sensor with integrated quench coil, made of stainless steel

1 ASTM-distillation column, 2 entrainment separators, with silvered high-vacuum mantle. Product cooler and condenser are integrated in the ASTM-column. The column dimensions are conforming to the flask size according to the ASTM-standard!!

1 safety cooler for the vacuum probe

1 head temperature sensor Pt-100, glass

1 column heating mantle for adiabatic operation, with temperature sensor Pt-100

1 vacuum sensor, with stainless steel diaphragm, range 10.0-0.01 Torr (other ranges upon request)

Common equipment for use in both distillation systems

1 fraction collector system, consisting of:
-carussel with 12 receivers
-automatic precision volume measurement of the distillate and the actual distillation rate
-automatic distillate collecting under vacuum condition
-heat up possibility of the distillate up to the bottom of final receiver

-control against overfilling of receiver
-no electronics in fraction collector housing
-electrical heating for line system down to distillate receivers (Potstill)

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1 cryostat and vacuum station, consisting of:

1 vacuum pump, 2-stages 18 m³/h, with throttle- and solenoid valves
1 glass vacuum cold trap with Dewar vessel for protection of the pump
1 gas trap made of glass with isolating valves

1 mounting frame, which is equipped with all electric and mechanic control elements, as well as lifting platform for the heating mantle and the stirrer drive, complete with all necessary holders and fastenings

1 Control and Evaluation Station PD 400
The control system is based on a multifunctional serial bus system integrated into the system basis and connected to a PC with windows based operation software.
The software allows a comfortable overview and input of all parameters, as well as the automatic creation of the final data tables and curves. All Parameters can be changed during the operation process and saved and recalled at any time. The final data tables and curves will be created automatically in Microsoft Excel.
The password protected service area gives the user an easy possibility to do calibration and maintenance work.

1 personal computer with TFT monitor and printer
1 electronic precision balance
1 system specific operation software and safety devices

OPTIONS

Water Removal

Stainless Steel Flask

Protective Sheathing of the System
Sheathing of the complete system basis with removable panels made of transparent polycarbonate with doors at the front side of the system

Gas Detector
Monitoring of hydrocarbons escaping from the system by means of a gas detector. In case combustible gases are detected, alarm will be given. When the alarm is ignored, the distillation will be switched off after a pre- selected time

Fire Extinguisher
Automatic fire fighting system with a steel cylinder with 10 kg of CO_2. UV-sensors for monitoring the system, control electronics and pyrotechnical valve. Shut-down of the system in case of alarm

UPS-System
Uninterruptible power supply for computer, processor and balance. The UPS-systems protects the system from data loss up to 20 minutes in case of power failure.(230 V, 50 Hz, 2000 VA - other voltages and capacities upon request).

4.2 PETRODIST 400 S

PETRODIST® 400 S



Crude oil distillation system for semi-automatic operation according to ASTM D-2892 (TBP) and ASTM D-5236 (Potstill)

The PETRODIST 400 S is a combination of the basic systems

* PETRODIST 100 S
* PETRODIST 200 S

The fraction collector, the vacuum supply, the cryo/ thermostat and the control station are used for both unit parts.

The cuts are taken automatically according to the pre-selected boiling temperature or when the receivers are filled up. The vacuum tight fraction collector contains 9 receivers.

All necessary accessories will be supplied together with the system. The installation requires water, nitrogen, compressed air and electricity.

Technical Data

Equipment for ASTM D-2892 (PD 100)

Flask size:	2, 4, 6, 10, 20 L
Flask charge:	up to 60 % of flask volume
Operation temperature:	up to 350° C
Operation pressure:	vacuum down to 1 Torr
Final cut temperature:	up to 420° C AET

Equipment for ASTM D-5236 (PD 200)

Flask size:	1, 2, 4, 6, 10, 20 L
Flask charge:	Up to 60 % of flask volume
Operation temperature:	up to 400° C
Operation pressure:	vacuum down to 0.1 Torr
Final cut temperature:	up to 650° C AET

Common specification

Fraction collector receiver capacity:	9 receivers, volume depending on flask size
Max. Ambient Temperature:	25° - 30°C
Main Supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)

Dimensions (L x D x H): Depending on flask sizes

The system consists of:

Equipment for PETRODIST 100 according to ASTM D-2892

1 electrical heating mantle for flask, with temperature sensor Pt-100, and integrated stirrer drive, insulation jacket for the upper half of the flask, including temperature sensor Pt-100

1 distillation flask, made of glass with connectors for temperature sensor, pressure drop measurement and N_2-bleed, incl. 1 flask temperature sensor Pt-100, stainless steel

1 ASTM-distillation column, DN 25 mm, with silvered high-vacuum mantle, including reflux divider in the liquid phase. Complete with packing Propak 316, separation efficiency approx. 15 theoretical plates, with solenoid coil for the reflux divider. The ASTM-column is conforming to the flask size according to the ASTM-standard!!

1 tower heating mantle for adiabatic operation, with temperature sensor Pt-100

1 main condenser with vacuum mantle, made of glass

1 distillate cooler with vacuum mantle

1 pressure drop sensor with safety cooler

1 vacuum sensor, with stainless steel diaphragm, range 100.0-0.1 Torr (other ranges upon request)

Equipment for PETRODIST 200 according to ASTM D-5236

1 electrical heating mantle for flask, with temperature sensor Pt-100, and integrated stirrer drive, insulation jacket for the upper half of the flask , including temperature sensor Pt-100

1 distillation flask, made of glass, with connector for temperature sensor, incl. 1 flask temperature sensor stainless steel

1 ASTM-distillation column, DN 36 mm, 2 entrainment separators, with silvered high-vacuum mantle, product cooler and condenser.

1 safety cooler for the vacuum probe

1 head temperature sensor Pt-100, glass

1 column heating mantle for adiabatic operation, with temp. sensor Pt-100

1 vacuum sensor, with stainless steel diaphragm, range 10.0-0.01 Torr

Common equipment for use in both distillation systems

1 system basis for the assembly of all parts, with mounting frame, equipped with all system specific electric, mechanic and hydropneumatic control elements, as well as lifting platforms for the isomantle heating bathes, including all necessary holders and fastenings.

1 cryo-vac-station equipped with:
- vacuum pump, 2 stages,12 m3/h, complete with oil filling and
- vacuum control device with solenoid control valve and throttlevalve
- 2 vacuum cold traps with Dewar vessels for protection of the pump
- 1 glass gas trap for the debutanization, with 2 stop isolating valves
- 1 cryostat for supply of condensers, distillate cooler, fraction collector

1 vacuum-tight fraction collector for automatic operation with 9 graduated receivers, with light barrier for over-charge protection

1 **distillation control unit DCD4001**

universal computer-controlled unit for PILODIST distillation systems as well as for an upgrade of existing distillation systems. The unit is designed for operation and control of temperature, vacuum, reflux divider, limit and alarm system as well as fraction collector. The service area is password protected and provides tools to change the controller settings. It also provides tools for the calibration of vacuum- and temperature sensors. All actual parameters are displayed continuously as a graphical trend (curves) during the distillation process to inform the operator about the actual status. The control system is based on a multifunctional serial bus system, connected to a PC with our new and most modern windows based operation software.
The DCD 4001 is delivered with operation software, a PC and the Interface box as central connection point for all sensors.

4.3 PETRODIST 400 CC

PETRODIST® 400 CC



Processor controlled combined crude oil distillation system for fully automatic operation according to ASTM D-2892 (TBP) and ASTM D-5236 (Potstill). PETRODIST 400 CC is a combination of the following systems:

- PETRODIST 100 CC (ASTM D-2892)
- PETRODIST 200 CC (ASTM D-5236)

Both systems can operate at the same time (simultaneously) in fully automatic, uninterrupted and unattended mode. The data evaluation software provides also a combined TBP-curve for both systems.

Compact design with control system and safety items for unattended operation. No operator intervention and no intermediate stops are required.

The system is delivered as a turn key system. Several optional accessories are available.

The system enables to perform TBP- and Potstill - distillations of various crude samples according to ASTM-standards and is designed for laboratory use.

The fraction/receiver changes are automatically performed according to preselected cut temperatures or in case of receiver overfilling. Both systems are equipped with individual fraction collectors to allow simultaneous operation of both systems. The final data and the TBP-curve in wt% and vol% are printed out after reweighing the residue.

The unit requires water, nitrogen, compressed air and electricity. Dry ice or liquid nitrogen is required for cold traps.

1.Distillation acc. to ASTM D-2892 (PETRODIST 100 CC)

The distillation performs fully automatically from the gas cut (IBP) to the pre-selected end point without any interruptions and any interventions throughout all

different pressure levels. The yield calculation refers to the weight of the flask charge.

Data station for overriding parameter input as well as for display and print-out of all operation parameters, distillation results and TBP-curve.

The system is modularly constructed and is expandable for water removal and other options.

The TBP-curve can be printed out in weight- and/or volume-percent.
All necessary accessories will be supplied together with the system. The installation requires water, nitrogen, compressed air and electricity

Technical data

Flask size:	1, 4, 6, 10 or 20 L
Flask charge:	30 – 60 % of flask size
Operation temperature:	up to 350° C (AET 420°C)
Operation pressure:	vacuum down to 1 Torr
Fraction collector:	20 receivers
Max. ambient temperature:	25° - 30°C
Mains supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (w x h x d):	depending on flask sizes

The PETRODIST 100 CC system consists of:

1 system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control elements, as

well as lifting platform for the insulating mantle heating bath, including all necessary holders and fastenings

1 heating bath with insulating mantle for flask with temperature sensor Pt-100 and integrated stirrer drive, insulation jacket for the upper half of the flask, including temperature sensor

2 glass distillation flasks , with connecting nozzle for temperature sensor, pressure drop measurement and N_2-bleed, with 1 flask temperature sensor with 1 quench cooler, made of stainless steel

1 distillation column 15 theoretical plates, including take off divider in the liquid phase with silvered high – vacuum mantle. Complete with packing, Propak 316, solenoid coil for the take off divider, with head temperature sensor Pt-100 with NS 14.5 cone,

1 column heating mantle for adiabatic operation, with built-in temp. sensor

1 glass main condenser with vacuum mantle,

1 distillate cooler with vacuum mantle

1 distillate weighing system with electronic precision balance for continuous recording of fraction weights under vacuum, with integrated balance receiver 1000 ml

1 discharge system with blockpot (intermediate receiver), servo valves and syringe system

1 fraction collector with 20 receivers, made of glass and sealed with septa

1 pressure drop sensor with protective cooler

1 vacuum probe, independent of the kind of gas, with stainless steel diaphragm, range 100.0-0.1 Torr (other ranges upon request)

1 cryo-vac station, equipped with:
1 vacuum pump, 2-stages 16 m³/h, with throttle- and solenoid valves for vacuum stabilisation
2 vacuum cold traps with Dewar vessels for protection of the pump
1 gas trap (pressure-proof up to 3 bar) with isolating valves and Dewar vessel
1 cryostat for cooling of main condenser and peripheral parts

2.Distillation acc. to ASTM D-5236 (PETRODIST 200 CC)

The distillation performs fully automatically from the start to the pre-selected or detected end point without any interruption. The distillate volume is automatically recorded by means of an integrated volume follower system. The volume is measured separately in every individual receiver. The unit does not contain any intermediate receiver to avoid a reblend of the distillate. The volume calculation is expressed as percentage corresponding to the weight and the volume of the flask charge or total recovery. The distillation curve is printed out in weight and volume percent. The fraction changes are carried out automatically, alternatively according to a pre-selected boiling temperature or distillate volume or when the receivers are filled up. The vacuum-tight fraction collector contains 12 receivers with a capacity related to the flask size. The boil up rate is controlled according to a pre-selected distillation rate in ml/min. An accurate vacuum control guarantees the required stability of the distillation pressure.All necessary accessories will be supplied together with the system. The installation requires water, nitrogen, compressed air and electricity.

Technical Data

Flask size:	3, 6, 10, 20 L
Flask charge:	30 – 60 % of flask size
Fraction collector:	12 receivers
Operation temperature:	up to 400° C (650°C AET)
Operation pressure:	vacuum down to 0.1 Torr
Max. ambient temperature:	25° - 30° C
Mains supply:	230 / 400 V, 50 Hz, 5-wire system, 3-phase + N + PE or upon request
Dimensions (w x h x d):	depending on flask size

The PETRODIST 200 CC system consists of:

1 system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control elements, as well as lifting platform for the insulating mantle heating bath, including all necessary holders and fastenings

1 heating bath with insulating flask mantle with temperature sensor Pt-100, integrated stirrer drive and air cooling, insulation jacket for the upper half of the flask, including temperature sensor

2 distillation flasks, made of glass, with connecting nozzle for temperature sensor, with 1 flask temperature sensor with 1 quench cooler, made of stainless steel

1 distillation head, 2 entrainment separators with silvered high-vacuum mantle. Product cooler and condenser are melted to the head. Head temperature sensor Pt-100, protective cooler for the vacuum probe

1 column heating mantle for adiabatic operation, with built-in temperature sensor

1 vacuum-tight fraction collector for automatic operation, for 12 receivers, with volume follower system and IR-heater for the receivers,

1 vacuum probe, independent of the kind of gas, with stainless steel diaphragm, temperature stabilised, range 10.0-0.01 Torr (other ranges upon request)

1 vacuum cold trap for protection of the vacuum pump, including Dewar vessel

1 vacuum pump, 2-stages, 16 m^3/h, complete with oil filling and vacuum control device with solenoid control valve and throttle servo-valve and bypass valve

1 compact thermostat, operation range –30° to +150°C,

3.Central control and evaluation station

The central control system is based on a multifunctional serial bus system integrated into the system basis and connected to a PC with the windows based operation software to operate either each system individually or both systems simultaneously.

The software allows a comfortable overview and input of all parameters, as well as the automatic creation of the final data tables and curves. All Parameters can be changed during the operation process and saved and recalled at any time. The final data tables, curves and the combination of distillation data's prepared under the standards ASTM-D2892 and ASTM-D5236 will be created automatically in Microsoft Excel.

The password protected service area gives the user an easy possibility to do calibration and maintenance work.

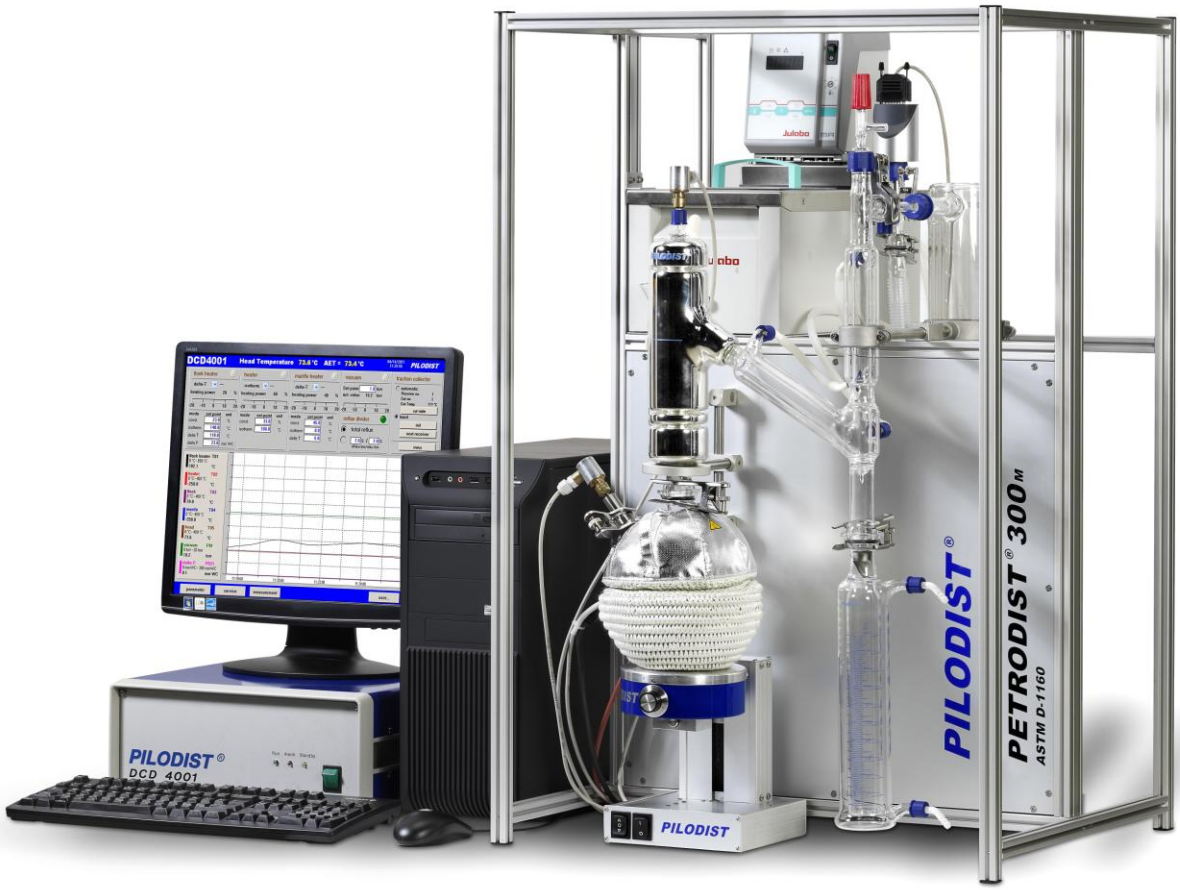
It consists of:

2 independent serial bus control systems (integrated into the system basis)
2 computer systems with flat screen and color printer.
1 software package with operating software and microsoft excel.
1 electronic Balance
1 set connection- and power cables

5. Boiling Analysis

5.1 PETRODIST 300 M

PETRODIST® 300 M



Manual Boiling Analysing System according to ASTM D-1160.

The charge, depending on the distillate receiver temperature, has to be filled in the flask.

The distillation is performed from the Initial Boiling Point (IBP) to the End Boiling Point (EBP) by the operator. The criteria for a distillation end are:

- the EBP in AET-temperature is exceeded
- the distillate volume is exceeded
- the maximum limits of heating bath temp. or flask temp. are exceeded (automatic control)
- product cracking in the flask

The distillate volume is measured by the operator in a temperature controlled receiver.

Technical Data

Flask size:	500 mL
Flask charge:	200 mL
Operation temperature:	max. 400° C
Operation pressure:	Down to 0,1 Torr
Boiling range:	max. 600°C AET
Max. Ambient Temperature:	25° - 30 °C
Mains Supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (l x w x h):	0.65 x 0.65 x 0.96 m

The system includes the following components:

1 heating mantle for flask 500 ml, including the temperature sensor Pt 100

1 insulation mantle for the upper half of the flask

1 lifting platform with integrated stirrer

1 distillation flasks, glass, 500 ml (2 pcs)

1 flask temperature sensor Pt 100, stainless steel

1 ASTM-column with silvered high vacuum jacket, with integrated product cooler and condenser

1 head temperature sensor Pt 100 (according to ASTM-standard)

1 graduated distillate receivers, 200 ml , with double mantle,

1 vacuum cold trap

1 vacuum sensor, range 100.00 – 1,0 mm Hg (other ranges upon request)

1 vacuum control valve with throttle valve

1 vacuum pump, 2-stages, 8 m^3/h

1 circulating thermostat, volume 3 l, operating range up to 150° C for operating the condenser and the distillate receiver

1 rack for the mounting of all items, which is equipped with all mechanical components and specific electric control elements

1 **Distillation control Device DCD4001**
Computer-controlled Device for PILODIST Distillation systems with all necessary and peripheral components.
Contains the operation and control elements for all parameters like Temperature, Vacuum, Reflux Divider, Limit and Alarm system, Fraction collector.
The actual parameters can be displayed in graphical curves to inform the operator about the actual status. The set Parameters can be saved as recipes and reloaded.
The control system is based on a multifunctional serial bus system, connected to a PC with our new and most modern windows based operation software.
The Distillation control Device comes along complete with all operation software, PC and Interface box as central connection point for all sensors.

Option
Immersion cooler for the automatic operation of the vacuum cold trap, closed process system, temperature range – 20° C. No operation with dry ice.

5.2 PETRODIST 300 CC

PETRODIST® 300 CC



Fully automatic crude oil distillation system, processor controlled according to ASTM D-1160 for the determination of boiling ranges of crude oil products under vacuum.

Key features of *PETRODIST® 300 CC*

- parameter input, display as well as calculation of distillation and final data and print out of the distillation curve via PC
- easy operation due to userfriendly software, operated under WINDOWS XP
- sophisticated safety system
- automatic heating and distillation rate as well as detection of initial boiling point (ibp)
- individual distillation reports and curves can be re-called any time
- precise distillation data due to automatic calibration of volume measuring system
- anti foaming by foam breaker
- precise vacuum control
- automatic washing run
- calculation of charge according to receiver temperature and charge density
- easy installation effort as the system is delivered ready for operation
- manual override of automatic operation
- automatic controlled termination of distillation process and start of cooling
- system can be upgraded with a fraction collector (option)

The distillation is fully automatic from the initial boiling point to the pre-selected end boiling point or detected break-off. The criteria for break-off are:

- the pre-selected final AET (atmospheric equivalent temperature) is reached
- the maximum bath temperature is reached
- the maximum flask temperature is reached
- the pre-selected distillate volume is reached
- the flask insert cracks
- the distillate pressure drops
- product lack in the flask

The distillation volume is measured automatically in a tempered receiver. The yield is calculated in percentage to the charge quantity. Distillation report, final data and distillation curve are printed out.

Technical Data

Flask size:	500 mL
Flask charge:	200 mL
Operation temperature:	up to 400° C
Operation pressure:	vacuum down to 0,1 Torr
Final cut temperature:	up to 600° C AET
Max. ambient temperature:	25° - 30° C
Mains supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (l x w x h):	0.65 x 0.65 x 0.96 m

The system consists of:

1 system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control elements including the distillation control with storage programmable control and all peripheral parts, it contains the following operation and display elements:

- system specific operation software
- internal service switches for all important functions
- mains switch and control light

1 heating bath with insulating mantle for 500 ml flask with temperature sensor Pt-100 and integrated stirrer drive, with electrical lifting platform and integrated stirrer, insulation jacket for the upper half of the flask, including temperature sensor

2 distillation flasks, 500 ml, made of glass, with nozzle for temperature sensor including 1 flask temperature sensor, made of stainless steel

1 distillation head with silvered vacuum jacket, with integrated product cooler and condenser, dimensions corresponding to the ASTM-method.

1 head temperature sensor Pt 100, immersion length 170 mm, designed for inert response (according to the ASTM-method)

1 volume measuring device for the automatic control of the distillation rate, heatable up to 100 °C, equipped with light barrier, servo drive and temperature sensor

2 distillate receivers, 200 ml each, calibrated

1 vacuum sensor, independent of the type of gas, with stainless steel diaphragm, 10.0 – 0.1 Torr (other upon request)

1 vacuum cold trap for protection of the vacuum pump

1 Immersion cooler for operation of the vacuum cold trap, temperature range – 20°C

1 solenoid valve for vacuum stabilisation with automatic throttle valve for adaptation of the pump's sucking capacity to the leakage rate of system

1 vacuum pump, 6 m³/h, 2 stages

1 circulating thermostat, 3 l, operating range +15°C to +150°C, electrical load 750 W, with temperature sensor

1 Control and Evaluation Station PD 300 CC
The control system is based on a multifunctional serial bus system integrated into the system basis and connected to a PC with windows based operation software.
The software allows a comfortable overview and input of all parameters, as well as the automatic creation of the final data tables and curves. All Parameters can be changed during the operation process and saved and recalled at any time. The final data tables and curves will be created automatically in Microsoft Excel.
The password protected service area gives the user an easy possibility to do calibration and maintenance work.

1 personal computer with TFT monitor and printer
1 system specific operation software and safety devices

Option

Automatic fraction collector with 4 receivers

5.3 PETRODIST 300 CC – F

PETRODIST® 300 CC-F



Fully automatic crude oil distillation system, processor controlled according to ASTM D-1160 but with automatic fraction collector for the determination of boiling ranges of crude oil products under vacuum. The system can be operated in strict

accordance to the ASTM procedure with 1 single receiver or alternatively, by using the automatic fraction collector, with 4 receivers.

Key features of *PETRODIST® 300 CC-F*

- parameter input, display as well as calculation of distillation and final data and print out of the distillation curve via PC
- easy operation due to userfriendly software, operated under WINDOWS XP
- sophisticated safety system
- automatic heating and distillation rate as well as detection of initial boiling point (ibp)
- individual distillation reports and curves can be re-called any time
- precise distillation data due to automatic calibration of volume measuring system
- anti foaming by foam breaker
- precise vacuum control
- automatic washing run
- calculation of charge according to receiver temperature and charge density
- easy installation effort as the system is delivered ready for operation
- manual override of automatic operation
- automatic controlled termination of distillation process and start of cooling
- **automatic fraction collector with 4 receivers**

The distillation is fully automatic from the initial boiling point to the pre-selected end boiling point or detected break-off. The criteria for break-off are:

- the pre-selected final AET (atmospheric equivalent temperature) is reached
- the maximum bath temperature is reached
- the maximum flask temperature is reached
- the pre-selected distillate volume is reached
- the flask insert cracks
- the distillate pressure drops
- product lack in the flask

The distillation volume is measured automatically in receivers, temperature controlled by an IR-heater. The yield is calculated in percentage to the charge quantity. Distillation report, final data and distillation curve are printed out.

Technical Data

Flask size:	500 mL
Flask charge:	200 mL

Fraction collector:	4 calibrated receivers, 100 mL each
Operation temperature:	Up to 400° C
Operation pressure:	vacuum down to 0,1 Torr
Final cut temperature:	up to 600° C AET
Max. ambient temperature:	25° - 30° C
Mains supply:	3 x 208 – 260 V, 50 Hz (60 Hz upon request)
Dimensions (l x w x h):	0.65 x 0.65 x 1,41 m

The system consists of:

1 system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control elements including the distillation control with storage programmable control and all peripheral parts, it contains the following operation and display elements:

- system specific operation software
- internal service switches for all important functions
- mains switch and control light

1 heating bath with insulating mantle for 500 ml flask with temperature sensor Pt-100 and integrated stirrer drive, with electrical lifting platform and integrated stirrer, insulation jacket for the upper half of the flask, heated with 0.25 W/cm² including temperature sensor

2 distillation flasks, 500 ml, made of glass, with nozzle for temperature sensor including 1 flask temperature sensor, made of stainless steel

1 distillation head with silvered vacuum jacket, with integrated product cooler and condenser, the dimensions of the distillation head corresponds to the ASTM-method

1 head temperature sensor Pt 100, immersion length 170 mm, designed for inert response (according to the ASTM-method)

1 volume measuring device for the automatic control of the distillation rate, heatable up to 100 °C, equipped with light barrier, servo drive and temperature sensor

1 automatic fraction collector with 4 calibrated receivers, 100 ml each

1 vacuum sensor, independent of the type of gas, with stainless steel diaphragm, 100.0 – 1,0 Torr (other upon request)

1 vacuum cold trap for protection of the vacuum pump

1 Immersion cooler for operation of the vacuum cold trap, temperature range – 20°C

1 solenoid valve for vacuum stabilisation with automatic throttle valve for adaptation of the pump's sucking capacity to the leakage rate of system

1 vacuum pump, 6 m³/h, 2 stages

1 circulating thermostat, 3 l, operating range up to +150°C, with temperature sensor

1 Control and Evaluation Station PD 300 CC-F
The control system is based on a multifunctional serial bus system integrated into the system basis and connected to a PC with windows based operation software.
The software allows a comfortable overview and input of all parameters, as well as the automatic creation of the final data tables and curves. All Parameters can be changed during the operation process and saved and recalled at any time. The final data tables and curves will be created automatically in Microsoft Excel.
The password protected service area gives the user an easy possibility to do calibration and maintenance work.

1 personal computer with TFT monitor and printer
1 system specific operation software and safety devices