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PETRODIST ®

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

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PETRODIST® is a brand name of ***PILODIST ®*** GmbH Germany

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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

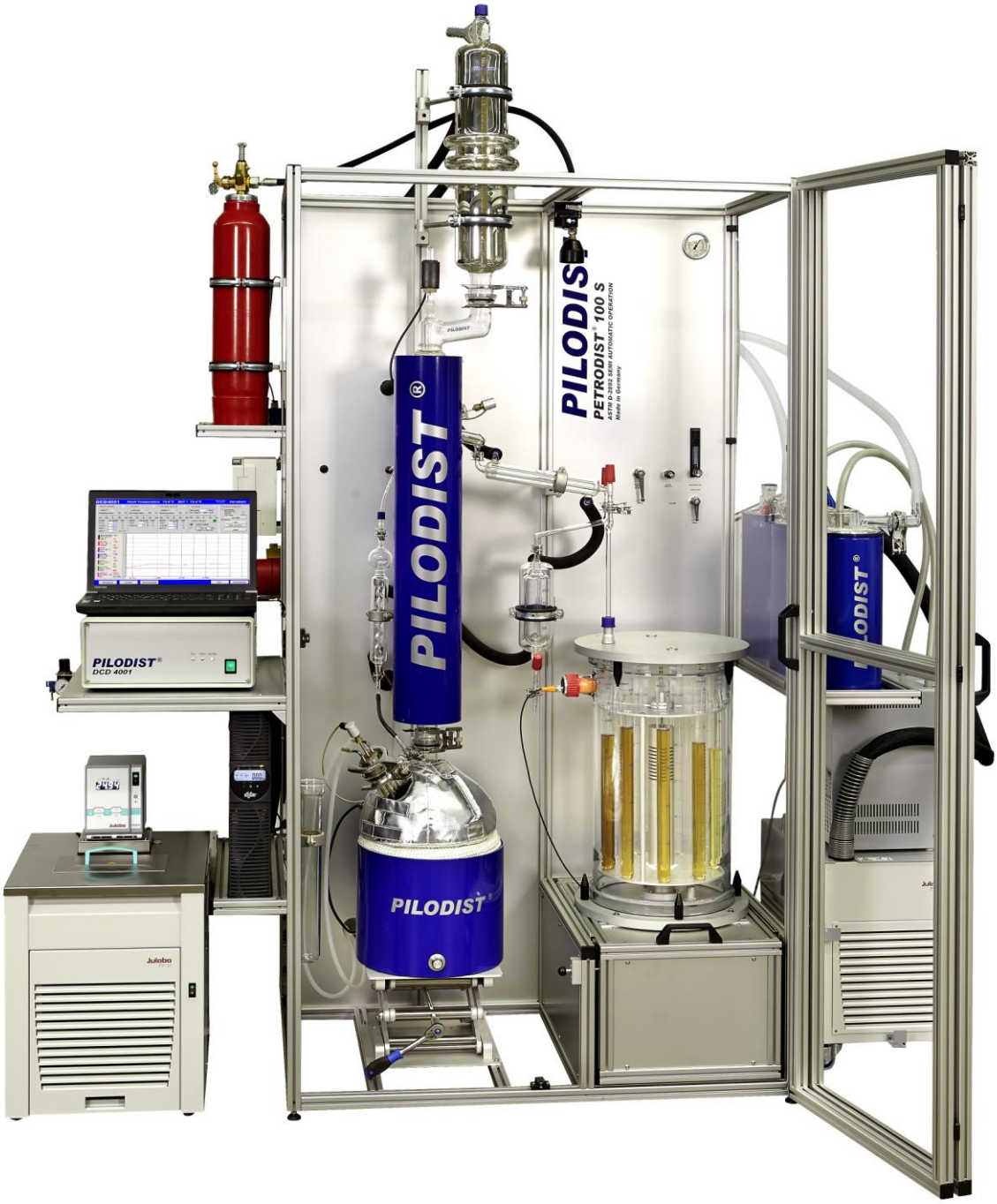
1 distillation control unit DCD4001

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, capacity depending on flask volume, 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, temperature range – 50 ... + 200 °C

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, automatic volume detection as well as optionally automatic online density measurement 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** automatic volume measuring
- optionally online density measurement

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 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, capacity depending on flask volume, 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, temperature range – 50 ... + 200 °C

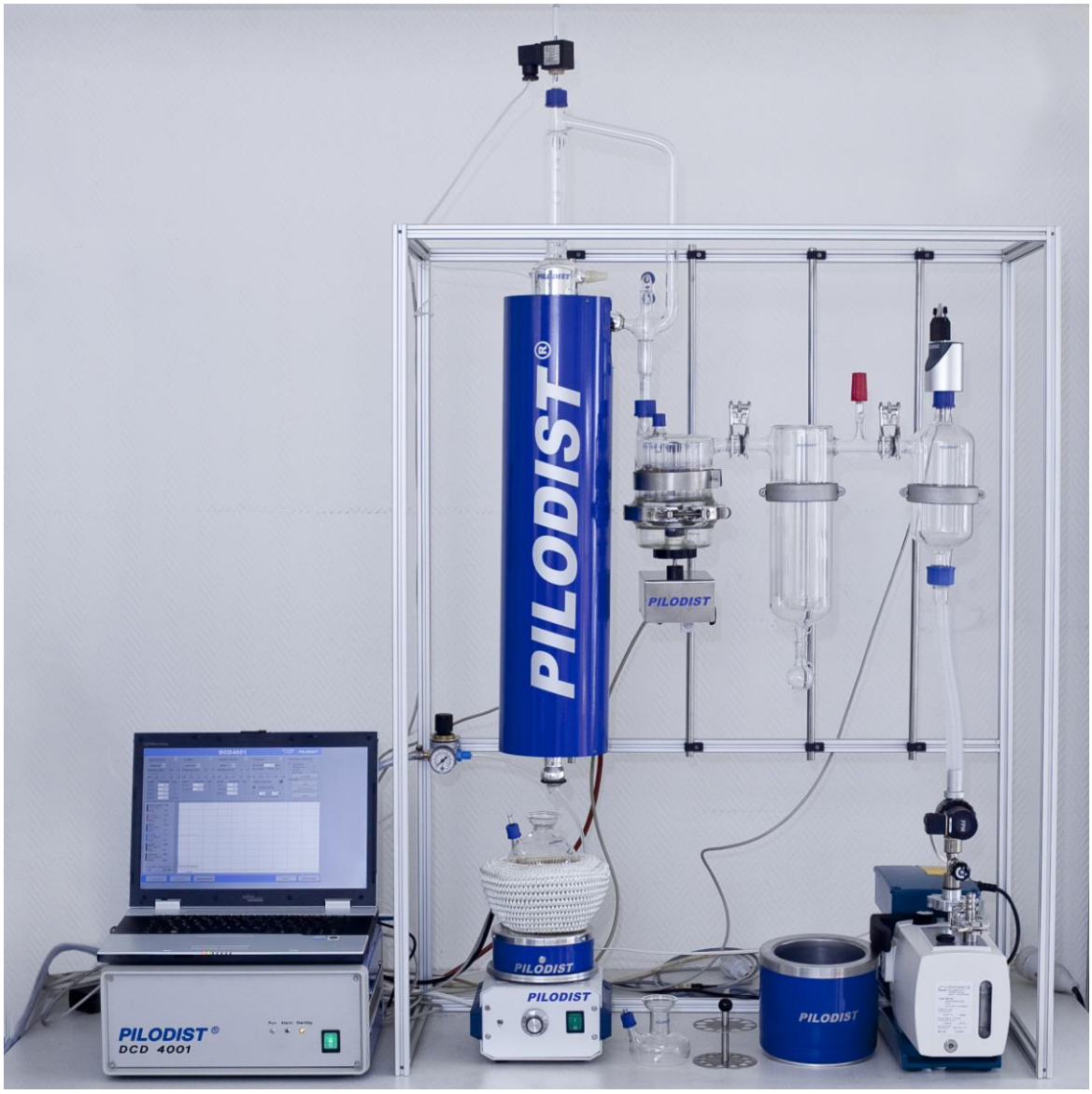
1 control and evaluation station PD100CC
The control system is based on a multifunctional serial bus system integrated into the system basis and connected to a PC with windows based operation software.
The software allows a comfortable overview and input of all parameters, as well as the automatic creation 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
online density measurement

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, capacity depending on flask volume, 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 automatic 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, capacity depending on flask volume,
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 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 system for alternative operation of the basic systems

* PETRODIST 100 S
* PETRODIST 200 S

The central fraction collector, the vacuum supply, the cryo/ thermostat 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, capacity depending on flask volume, 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, temperature range – 50 ... + 200 °C

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.

4.2 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, capacity depending on flask volume 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 cryostat, temperature range – 50 ... + 200 °C

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).

4.3 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 – 10 l flask size (ASTM D-2892)
- PETRODIST 200 CC – 6 l flask size (ASTM D-5236)

The combination system provides a central vacuum supply, thermostat and computer control and evaluation station for alternative use of either of the two distillation systems. System provides Windows(R) -based software with fully automatic data acquisition and analysis as well as LIMS connection. Both systems provide weight measurement as well as volume measurement.

The systems can be operated alternatively in fully automatic, uninterrupted and unattended mode. By adding option 6 the system will be able to operate simultaneously!

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.

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

The optionally quoted accessories will enable the user to run both systems simultaneously.

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

Processor controlled crude oil distillation system for fully automatic, unattended operation exactly conforming 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:

- dehydration (manual/semi-automatic process prior to automatic distillation)
- debutanization
- 1. run at atmospheric 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 of the operator. The individual fractions are being collected in an inbuilt balance receiver with online high precision weight measurement via an in-built electronic balance and the volume of each fraction is detected automatically prior to the discharge from the system into the automatic fraction collector, which operates with 20 septum-sealed receivers. By replacing the 20 receivers after each of the 4 runs the overall numver of cuts/receivers for all 4 runs is 80. The receiver change is performed according to a pre-selected boiling temperature or when a receiver is filled up.

Optional online density measurement can also be provided for each fraction.

Due to the fully automatic uninterrupted operation the complete distillation procedure takes only a period of up to approx. 18 hours, depending on the individual crude oil charge.

After the distillation the operator has to weigh from the gas trap as well as the flask residue by the external balance (part of delivery), the weights are automatically taken by the system and as a result the final data evaluation and TBP-curves in weight-% and volume-% are printed out and can be stored.

The system requires for operation water, nitrogen, compressed air and electricity to be supplied by lab infrastructure.

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, capacity depending on flask volume, 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, temperature range – 50 ... + 200 °C

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

Processor controlled crude oil distillation system for fully automatic operation according to ASTM D-5236 (Standard Test Method for Distillation of Heavy Hydrocarbon Mixtures, Vacuum Potstill Method).

The system is designed for unattended operation (during the distillation), the safety devices are designed accordingly. Data station for data input as well as for display and print out of all operation parameters, distillation results and distillation curve.

The distillation ensues automatically from the start to the pre-selected or detected end point. The distillate volume is automatically recorded by means of an integrated volume follower system. The volume is measured separately on every individual receiver. The unit does not contain any intermediate receiver i.e.: to avoid reblend of the distillate. The weight of each fraction is automatically taken by an integrated electronic balance.

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.

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, capacity depending on flask volume, 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.

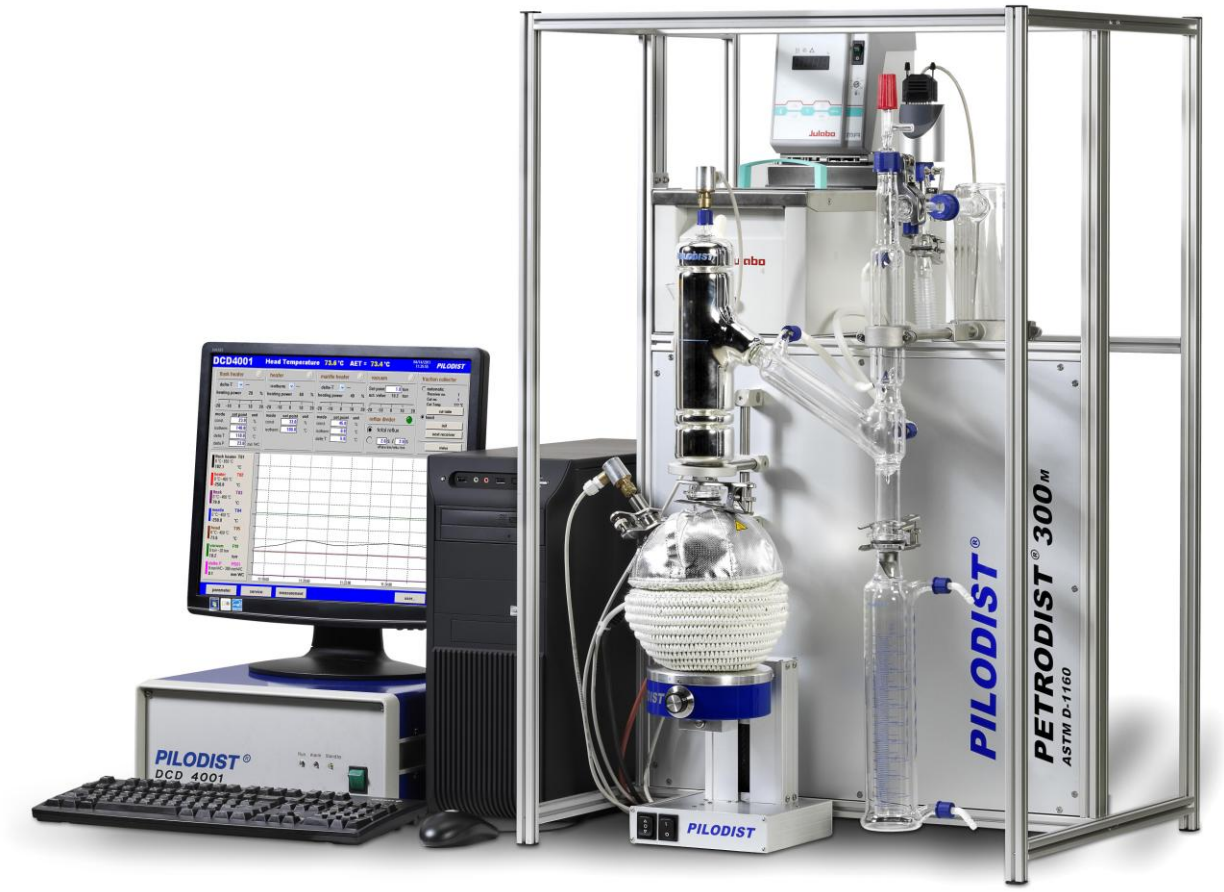
It consists of:

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 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 temperature or flask temperature are exceeded
- product cracking in the flask
- vacuum loss

The distillate volume has to be measured by the operator in a temperature controlled receiver.

Technical Data

Flask size:	500 ml
Flask charge:	200 ml
Operation temperature:	Up to 400° C (750° F)
Operation pressure:	Vacuum down to 1 Torr
Final cut temperature:	Up to 620° C AET (1020° F)
Power consumption:	3500 W (without options)
Max. ambient temperature:	25° C
Mains supply:	208-250 V, 50 Hz (standard) 208-250V, 60 Hz (optional)
Dimensions (w x h x d):	0,65 x 0,98 x 0,65 m

The system consists of:

1 electrical high temperature heating bath 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

2 distillation flasks, made of glass, 500 ml

1 flask temperature sensor PT-100, 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 (according to ASTM-standard)

1 graduated distillate receivers, 200 ml , with double mantle, and dripping plate

1 vacuum cold trap

1 analog manometer from -1...+0,6 bar for display of actual system pressure status

1 vacuum sensor, independent of the type of gas, with inconel diaphragm, measuring range 100 Torr absolute pressure (other ranges upon request)

1 vacuum control valve with throttle valve

1 vacuum pump, 2-stages, 8 m3/h

1 circulating heating thermostat, 3 l, operating range +15°C... +150°C

1 set of lines, sealings and accessories

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

1 Distillation control Device DCD 1001
basic controller for the following functions:

- heating power controller 0 – 100%
- temperature displays for flask and head temperature
- vacuum controller with display.

Options

Option 1
For application of atmospheric or biodiesel distillation as well as dehydration process prior to distillation a cooling thermostat is required
circulating thermostat, 3 l, operating range -20°C... + 200°C,
(instead of +15°C...+150°C as included in standard scope of supply)

Option 2
For operation with a power supply frequency of 60Hz instead of 50Hz.
With this option the PD300 M will be equipped for **208-250V 60Hz** use (instead of 208-250V 50Hz) free of charge.

Option 3
Immersion cooler for the automatic operation of the vacuum cold trap down to -40°C instead of operation with dry ice.

Option 4
ASTM D1160 reference fuel (n-Hexadecane), bottle of 500 mL,

Option 5
Distillation Control Device DCD4001 for automatic heater control as well as laptop for evaluation & final data generation incl. distillation curve
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, Limit and Alarm system. 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.
Via a special software button, the actual Head temperature (AET) can be transferred to a excel sheet for the automatic generation of the final data's with boiling point curve.
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 option consists of DCD 4001 (instead of DCD 1001) and includes a laptop and special PD300M operation software and interface box as central connection point for all sensors

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.

By adding option 1 the system will be able to do atmospheric distillation, dehydrate water prior to the distillation process and to use biodiesel as charge.

Special advantages of the new ***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
- sophisticated safety system
- 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 and dynamic pressure reduction during evacuation
- 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
- automatic controlled termination of distillation process and start of cooling
- In addition to the fixed values for evaluation requested by ASTM (5%, 10%, 20% 30%...) – PD300CC can add plus 5 flexible values in between
- In addition to the volume point setting PD300CC offers additionally 5 temperature points to be set for volume determination
- atmospheric distillation **(by adding option 1)**
- water removal (dehydration) process prior to distillation **(by adding option 1)**
- biodiesel distillation **(by adding option 1)**

The distillation runs automatically 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 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
Operation temperature:	Up to 400° C (750° F)
Operation pressure:	Vacuum down to 1 Torr
Final cut temperature:	Up to 620° C AET (1020° F)
Power consumption:	3500 W (without options)
Max. ambient temperature:	25° C
Mains supply:	208-250 V, 50 Hz (standard) 208-250V, 60 Hz (optional)
Dimensions (w x h x d):	0,65 x 0,98 x 0,65 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

2 distillation flasks, 500 ml, made of glass, with nozzle for temperature sensor

1 flask temperature sensor PT-100

2 magnetic stirrer bar 30mm

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

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 according to the ASTM-method

1 volume measuring device for the automatic control of the distillation rate with light barrier equipped,

1 light barrier for IBP detection

1 receiver chamber, heatable up to 80 °C with temperature sensor

2 distillate receivers, 200 ml

1 vacuum sensor, independent of the type of gas, with inconel diaphragm, measuring range 100 Torr absolute pressure (other ranges upon request)

1 analog manometer from -1 ... + 0,6 bar for display of actual system pressure status

1 vacuum cold trap for protection of the vacuum pump

1 immersion cooler for operation of the vacuum cold trap down to – 40°C

1 solenoid valve for vacuum stabilisation with automatic throttle valve

1 vacuum pump, 8 m³/h, 2 stages

1 circulating heating thermostat, 3 l, operating range +15°C... +150°C

1 distillation control & data evaluation station 300 CC with computer and printer for input of all distillation parameters and for display of pre-selected, calculated and actual operation values, with continuous communication to processor, supervising data station. All set values can be modified during operation. Calculation of the distillation results, manipulation of the data as well as printout of yield and distillation curve. Parameters can be stored as recipies and can be reloaded. Results and distillation curves including oil specific data and laboratory code are stored as excel files and can easily be transferred via network to other users.

Options

Option 1
For application of atmospheric or biodiesel distillation as well as dehydration process prior to distillation a cooling thermostat is required
circulating thermostat, 3 l, operating range -20°C... + 200°C,
(instead of +15°C...+150°C as included in standard scope of supply)

Option 2
For alternative operation of pressure ranges between atmospheric down to 100 Torr we offer an additional sensor
calibrated vacuum sensor, independent of the type of gas, with inconel diaphragm, measuring range 1000 Torr, accuracy +/- 0,25 % from reading

Option 3
For operation with a power supply frequency of 60Hz instead of 50Hz.
With this option the PD300CC will be equipped for **208-250V 60Hz** use (instead of 208-250V 50Hz) free of charge.

Option 4
ASTM D1160 reference fuel (n-Hexadecane), bottle of 500 mL,

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 or alternatively, by using the automatic fraction collector with 4 receivers.

By adding option 1 the system will be able to do atmospheric distillation, dehydrate water prior to the distillation process and to use biodiesel as charge.

Special advantages of the new ***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
- sophisticated safety system
- 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
- automatic controlled termination of distillation process and start of cooling
- automatic fraction collector with 4 receivers
- dynamic vacuum reduction procedure analogue ASTM D-5236 (Potstill) is possible
- atmospheric distillation **(by adding option 1)**
- water removal (dehydration) process prior to distillation**(by adding option 1)**
- biodiesel distillation **(by adding option 1)**

The distillation runs automatically 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 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
Operation temperature:	Up to 400° C (750° F)
Operation pressure:	Vacuum down to 1 Torr
Fraction collector:	4 calibrated receivers, 100 ml each
Final cut temperature:	Up to 620° C AET (1020° F)
Power consumption:	3500 W (without options)
Max. ambient temperature:	25° C
Mains supply:	208-250 V, 50 Hz (standard) 208-250V, 60 Hz (optional)
Dimensions (w x h x d):	0,65 x 2,02 x 0,75 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

2 distillation flasks, 500 ml, made of glass, with nozzle for temperature sensor

1 flask temperature sensor PT-100

2 magnetic stirrer bar 30mm

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

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 according to the ASTM-method

1 volume measuring device for the automatic control of the distillation rate with light barrier equipped,

1 light barrier for IBP detection

1 fraction collector chamber, heatable up to 80 °C with temperature sensor

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

1 vacuum sensor, independent of the type of gas, with inconel diaphragm, measuring range 100 Torr absolute pressure (other ranges upon request)

1 analog manometer from -1 ... + 0,6 bar for display of actual system pressure status

1 vacuum cold trap for protection of the vacuum pump

1 immersion cooler for operation of the vacuum cold trap down to – 40°C

1 solenoid valve for vacuum stabilisation with automatic throttle valve

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

1 circulating heating thermostat, 3 l, operating range +15°C... +150°C

1 distillation control & data evaluation station 300 CC-F with computer and printer for input of all distillation parameters and for display of pre-selected, calculated and actual operation values, with continuous communication to processor, supervising data station. All set values can be modified during operation. Calculation of the distillation results, manipulation of the data as well as printout of yield and distillation curve. Parameters can be stored as recipies and can be reloaded. Results and distillation curves including oil specific data and laboratory code are stored as excel files and can easily be transferred via network to other users.

Options

Option 1
For application of atmospheric or biodiesel distillation as well as dehydration process prior to distillation a cooling thermostat is required
circulating thermostat, 3 l, operating range -20°C... + 200°C,
(instead of +15°C...+150°C as included in standard scope of supply)

Option 2
For alternative operation of pressure ranges between atmospheric down to 100 Torr we offer an additional sensor
calibrated vacuum sensor, independent of the type of gas, with inconel diaphragm, measuring range 1000 Torr, accuracy +/- 0,25 % from reading

Option 3
For operation with a power supply frequency of 60Hz instead of 50Hz.
With this option the PD300CC-F will be equipped for **208-250V 60Hz** use (instead of 208-250V 50Hz) free of charge.

Option 4
ASTM D1160 reference fuel (n-Hexadecane), bottle of 500 mL,