



MINIDIST 1160

version V7.5

Technical Specifications MINIDIST 1160 Version V7.5 embedded PC Pentium fully automatic ASTM D1160 distillation unit

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The unique fully automatic ASTM D1160 distillation apparatus from GECIL Process .

The only fully automatic vacuum distillation apparatus based on more than 40 years of manufacturing experience and continuous improvement using the latest technology .

MINIDIST 1160 V7 is the direct result of more than 40 years of research and development with several major petroleum research centers. GECIL process has been the first company worldwide to manufacture fully automatic distillation ASTM D1160 unit with PC controller in the 80's .

GECIL Process is not only a glassblowing company putting together the necessary components in order to comply with the latest ASTM method but we are specialists for more than 40 years of automation of petroleum testing apparatus with a special focus on distillation . Our expertise in automation allows us to upgrade to the latest control instrumentation all our crude oil evaluation distillation apparatus manufactured and installed since 1974 . Most of our original and current distillation users have been taking this possibility to give to their original investment a new life with the latest electronic's and automation developments. This is our policy since the beginning and by using one of our distillation units , you will be sure that your investment will last for many years . Some of our customers are currently running units more than 25 years old .

Since 1974 we introduced 7 generations of automatic control distillation units for our line of distillation apparatus . The latest version V7 include a built in industrial PC Pentium Linux with only one interface board to control all elements of the process distillation cabinet, this allows the operator to operate the unit locally with all features of our previous external PC supervisor software GECDIST Net under Windows . **No need of an external PC but all the benefits and features of GECDIST V7 software .**

The MINIDIST 1160 V7 is the top of our line of D1160 distillation apparatus . **In it's local mode operation this unit is the smallest bench size unit as no external PC is required next to it .**

Our continuous feedback from our users and participation to several standardization organizations such as ASTM keep us on top of the latest modifications and improvements for the distillation apparatus made by our company . GT instruments our subsidiary in Texas USA has been distributing and servicing our petroleum testing equipments in North and South America since 1984.

General Specifications MINIDIST 1160 Version V7.5

Fully automatic distillation unit in accordance with ASTM D1160 method for the distillation of residues and heavy cuts with automatic procedure from atmospheric to reduced pressure without any intervention from the operator. Includes a 25 mm internal diameter column D1160 and a 500 ml quartz flask.

This unit can carry out all types of discontinuous distillation of chemical and organic components for boiling temperatures up to 250 °C under atmospheric and reduced pressure at 0.5 mmHg being an atmospheric equivalent temperature (AET) of 575 /600 °C/1050/1100 °F.

The complete D1160 distillation can be performed without human intervention from loading the sample to the Final boiling point .

The distillation control of the heating rate is automatically controlled by direct control of the distillation rate measured by the automatic level follower (technique which has been developed by GECIL in the 70's) .

The MINIDIST 1160 V7.5 process cabinet is a closed cabinet with safety door for easy access. In the Version V7 of MINIDIST 1160 a built in industrial Linux PC with interface process board has been implemented in the local process cabinet with a color LVDS display and industrial alphanumeric keyboard and a mouse. It also includes several USB ports and Ethernet Port to transfer results in xls or pdf format to a Lims

I. PROCESS UNIT DESCRIPTION

A double silvered adiabatic jacket column ASTM D1160, a boiling flask in quartz 500ml capacity, a 200ml distillate receiver thermostated by warm circulating air in the receiver chamber, a vacuum trap allowing the protection of vacuum pump and pressure sensor, PT100 probes, a level follower system allowing the measurement of distillate volume and the adjustment of the heating rate in accordance with the distillation rate in ml/mn, a vacuum pump and a thermostated bath to control the condenser's temperature.

All elements of the process are within a process cabinet closed by a plexiglass door for safety .

Overall size 47 cm Depth x 88.5 cm Width x 86.5 cm height

a) Vacuum system :

- type of vacuum pump 2005SD flow rate 5,4 m³/H , limit pressure value < 2 x 10⁻² mbar power supply is 110-230 V mono 50 / 60 Hz
- Vacuum pump trap in glass with a light end flask and a group of electrovalves for vacuum regulation and automatic return to atmospheric pressure.
- electronic vacuum sensor integral Barocel 0-10 torrs
- accuracy in regulation +/- 0,01 mmHg at 1 mmHg set point
- Dynamic vacuum operation lowering

b) Thermostatic circulation bath

allows the automatic regulation of temperature in the column condenser in accordance with the method.
Capacity of the bath 3 liters , Heating power 1000 W Power supply 220 V - 50 Hz or 110 V 60 Hz
Temperature regulation by the PC Board with PT 100 probe with accuracy 0,5 °C

c) Glassware

- boiling flask in quartz capacity 500 ml , distillate receiver 250 ml maxi
- double silvered adiabatic jacket column ASTM D1160
- heating flask and insulating mantle 350W in 220V or 350 W in 110V
- automatic cooling device by compressed air , max 3 bars
- PT 100 probes in the head and the flask accuracy $\pm 0,1^{\circ}\text{C}$

d) Thermostated Level follower system .

This mechanical system with stepping motor allows the automatic first drop detection, the calculation of distillation rate in ml/min and the recovering of distillate volume results in the receiver every 0,5ml with accuracy less than 0,1 ml.

This follower system and the distillate receiver are both located inside a thermostated chamber , also called receiver chamber ,and include a PT100 probe for automatic heating control by the computer.

e) Built in industrial Linux PC controller V7.5

GECIL process has been the first manufacturer of automatic distillation with PC controller in the 90's . Since then we designed PC external controller from 286 to Pentium PC W7 Pro . The new generation MINIDIST 1160 version V7.5 is a new step in the technology by implementing directly in the process cabinet a built in industrial Linux PC with only one process interface board , reducing to the minimum the number of boards . This configuration includes the following :

- (1) Industrial PC104 board Linux PC V7.5 with GECIL multitasking system and distillation software version GECDIST V7 Linux
- (4) USB Ports
- (1) static flash memory card to store software and unlimited number of distillation results
- (1) A/D and I/O interface board.
- (1) 10" LVDS Color display mounted in front panel of Cabinet
- (1) industrial alphanumeric Keyboard and Mouse
- (2) RS32 /RS485
- (1) Printer with USB port
- (1)- Ethernet Port for data transfer to a server LIMS

a Graphic Linux printer A4 is delivered with each unit and can be located next to the unit .

II OPTIONS

Option Heating flask higher wattage Cat N° 0J14803 470W 220V or 0J14803-110V 470W 110V

Option D Pressure sensor 0-100 torrs with software (Cat no 3E15230)

Option D-2 Pressure sensor 1000 toors with T support for dual sensor operation Cat N° 3CAPT.1000T.UPGRA

Option F Antifoaming bottom column detector with sensor , support and software (Cat no 3J17010-AF)

Option HT Cooling , heating circulating bath with up to 150°C with High temp tubings for the condenser
For high viscosity and density samples Cat N° 3BATH1160-HT

Option G Cryoplunger for main vacuum trap -20C. This option avoid the operator to use Dry Ice and Acetone. (Cat no 3D14039 for 220V)

Option L Electrical labjack for D1160 Cat N° 3J16611-1160

Option M Multisequence software allowing to run D5236 method with up to 6 steps on the same sample , making possible to prepare up to 6 fractions .

III D1160 GECDIST V7 SOFTWARE SPECIFICATIONS

The distillation **ASTM D1160 GECDIST V7** program is designed for an easy operator use through several menus with Linux under a real time operating system with Linux industrial Board built in the Process Cabinet .

Principal features:

- **Auto start of the program** with the main options of the operating system as well as visualize the hard disk files, copy one or several files on the USB key for distillation results or the main program and many other possibilities.
- Log in with password with several users level : User . Admin , SuperAdmin
- **Storage of the operating and controlling data in unlimited number of different files** which allow to perform different types of sample without a new introduction by the operator.
- **Printing of the operating and controlling data** files on the screen or the printer.
- **Testing program** for first level diagnostic of the unit on all the process cabinet and control computer elements.
- Calibration Menus for temperature probes , Pressure sensors , follower level
- **Printing of the results** in % volume measured in accordance with the ASTM D1160 with **charts and graphic curves** or TBP results.
- Display in real time of curves of all involved data
- **Printing of continuous TBP** curve from D2892 results to D1160
- User friendly operating dialogue of the distillation program.
- **Display in real time during the distillation at operator choice** of the mimic picture of the process, the diagnostic picture, the operating and controlling data file, the curves of one or several analogical parameters.
- **Modifying all parameters involved in the distillation to custom built new distillation program** .
- **Automatic cleaning program procedure.**

With the MINIDIST V7 with GECDIST V7 ASTM D1160 software the operator can :

- automatically run the distillation under atmospheric or reduced pressure
- program in °C or °F
- perform ASTM D1160 distillation on any type of heavy cuts or petroleum residues .
- **modify in real time any parameters** during the distillation.
- **Automatic Dynamic vacuum set point lowering from xx mmHg to minimum achievable vacuum**
- Display of curves with auto scaling and manual scaling .
- Unlimited storage of distillation programs or results
- Mouse access to all functions and parameters
- New synoptic display with direct access to each elements of the process with the mouse and visualization and control of operating mode (On,Off, Auto) and all controlling , alarms parameters involve in the element .
- History log file saving for each analysis for future use or for transfer to maintenance.
- Saving of all Controlling , sequence and operating parameters, all results , Calibration file , process system file used to run an analysis in one folder . No limitation of file name length
- Possibility to create a TXT, Pdf files of the final report .
- Possibility to Create an Excel file xls of the results .
- Easy transfer of results data file via Ethernet TCP/IP protocol .
- Easy configuration of GECDIST V7 as a PC in your network

The distillation program automatically controls the distillation rate in accordance with the method, cools down the boiling flask, regulates the pressure down to 0.2 mmHg, the degassing of the sample, the detection of the first drop, the condenser and receiver heating liquid, displays and memorizes all analogical measures, controls the safety levels and **memorizes the distillation step in case of a power failure.**

In addition with the **MINIDIST V7** controller, the program can store unlimited number of **different distillation result files** for the ASTM final balances and the analog measures as well as the temperatures, the pressure, the distillate rate... recorded during the distillation.

The new version V7 includes several submenus in its easy user friendly windows style software which allows easy life for the end user to comply with ISO requirements :

- print of spare parts list with technical description, cat number
- print of a traceability data for each components included in the apparatus at time of manufacturing (part description, cat n°, technical specifications, serial numbers)
- calibration menu which allows display, print and modification of calibration information for all temperature sensors, pressure sensor, level follower receiver and reference calibration sample.

Calibration capabilities :

The new software V7 allows to verify before each start of a distillation if the unit needs to be calibrated or if a calibration of one of the elements of the unit need to be calibrated.

If such a situation appears when starting a distillation, the operator can decide to continue but an information message will be printed at the end of the final report until the calibration is done.

The unit automatically checks the deviation of the A/D signals and requests a calibration if it is out of specifications. Each PT100 probe is characterized with 2 calibrated points with deviation data and a serial number. GECIL Process can deliver PT100 with calibration curve or the end user can do it if he has the correct tools in hand.

The pressure sensor can routinely be calibrated in accordance with ASTM procedure at specific date introduced by the end user or the factory (distillation of n cetane or N tetradecane).

The calibration data of the receiver to collect the distillate are stored and can be verified with serial number of the receiver.

This new software also lets the possibility to the end user to use his own standard reference sample to compare routinely the good operation of its unit. As you certainly know such standard sample for D1160 does not exist on the market and generally each laboratory creates its own. The new software compares between 2 results and indicates the ASTM acceptable deviation.

V ELECTRICAL SPECIFICATIONS

- frequency 50 Hz - Voltage 200-230 V Mono phase
- Or
- frequency 60 Hz - voltage 100-120 V Mono phase