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Process and Chemical Engineering

Process Trainers with digital controllers



Process Trainers with digital controllers

Teach a basic understanding of process engineering using our process training systems. The four essential processes of *batch distillation*, *solid-liquid extraction*, *batch reaction* and *absorption* can be conveyed in clear and educationally logical fashion with the help of our Industrial Process Trainers (IPT).

IPT 12 Batch Distillation



IPT 12 Batch Distillation

Distillation is one of the most important processes involved in process engineering for the chemical and petrochemical industries. For an overall understanding of a process engineering system, it is important to know each individual step required. The process training system ***IPT 12 Batch Distillation*** offers an ideal introduction to thermal separation processes, with which the essential basics of a distillation process can be taught.

Distillation is one of the oldest methods for purifying a mixture of substances or for raising concentration. The procedure is based on the physical principle that boiling up a mixture of liquids causes the concentration of the individual components in the liquid and vapour phases to be affected as a function of pressure and temperature. The exact concentrations can sometimes only be established by means of experiment.

With the ***IPT 12 Batch distillation*** training system it is possible to illustrate the physics of the separation process and the fundamentals of non-continuous production techniques. The system is manufactured from high-quality, industrial borosilicate glass 3.3, such as that used in the chemical industry. This offers the user a variety of options: in this distillation system, practically any mixture to be separated may be processed. In addition, users get direct visual feedback from the interior of the system.

Education objectives:

- First principles of discontinuous rectification
- Application McCabe-Thiele diagram
- Comparison practical to theoretical separation stage
- Mass and energy balance
- Influence of efficiency of:
 - Heating power
 - Reflux ratio

Basic equipment set, consisting of:

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Pos.	Product name	Bestell-Nr.	Anz.
1	IPT12 Batch Distillation, big version	LM3120	1

Apparatus:

- Packed column DN 25 filled with Raschig Rings
- Safety heating mantle (400 W) with two Heating zones, incl. Temperature control and two displays
- Condenser 0.1 m² with reflux divider
- Distillate vessel 0.25 l
- Agitator drive (70 W) with stirring paddle
- 3x resistance thermometers (Pt100, 4-wire)
- 2x optical level sensors
- 1x electromagnet for reflux divider
- 2x solenoid valve for distillate reflux and distillate outflow

Dimension:

Height x width x depth: 1600 x 800 x 700 mm

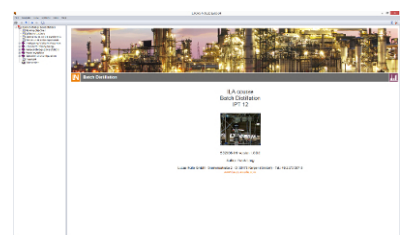


Media:



Pos.	Product name	Bestell-Nr.	Anz.
2	Interactive Lab Assistant: batch distillation	SO2806-1B	1

Multimedia experiment software with instructions and documentation for the process trainer batch distillation.



Additionally recommended

Pos.	Product name	Bestell-Nr.	Anz.
3	Lab table SybaPro, 1600x800x760mm, Process and chemical engineering	ST8031-1Q	1

It is an exemplary equipment. We manufacture your laboratory according to your wishes and requirements!

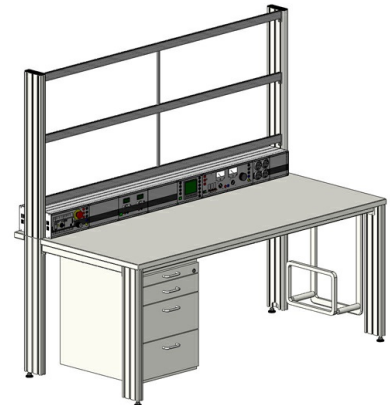
Laboratory bench

Highly-compressed 30mm-thick multi-layered fine chipboard conforming to German Industrial Standard (DIN) EN 438-1

- Colour grey RAL 7035, slightly textured 0.8mm-thick coating on both sides conforming to German Industrial Standard (DIN) 16926
- The border of the table top is a solid, impact-resistant protective trim made of 3mm-thick grey RAL 7047 coloured plastic
- The coating is resistant to a wide variety of chemicals and reagents such as dilute acid and alkaline solutions. Furthermore it is heat resistant even to liquid solder or the hot spots resulting from soldering irons and lit cigarettes, for example.
- Sturdy, continuous rectangular-tube frame with all necessary slots for fitting table legs and under-table cabinets, with approx. 0.8µm-thick acid-resistant epoxy resin coating
- 2 table legs, extruded aluminium profile, 705mm
- 2 table legs, extruded aluminium profile, 730mm
- 8 identical grooves in the extruded aluminium profile (3 grooves on each broad side and 1 on each narrow side)
- Grooves for mounting standard industrial brackets
- Two separate internal cable channels for wiring
- Integrated height-adjustable feet to compensate for uneven flooring
- Height of table top: 750mm
- Dimensions 1600 x 800 x 750mm (WxDxH)

Utensil drawer

- 3 drawers 2 HU
- 1 drawer 4 HU
- Usable width 330mm, Usable depth: 480mm
- Central locking
- Metal drawers with surrounding row of slots
- Body made of 19mm-thick, highly-compressed, multi-layered fine chipboard with grade E1 plastic coating on both sides
- Dimensions: 430 x 588 x 560mm (WxHxD)



Power ducting

for 1600-mm wide SybaPRO tables to accommodate 19", 3-HU inserts and panels

- To accommodate up to 25 x 12-PU (294 PU) 3-HU modules
- Can be fitted as console or as table-top ducts
- Pre-wired with power supply bus system for 3 HU inserts or panels
- Terminal strips for connection to existing power supply
- Base and lid made of anodised E6/EV1 extruded aluminium profiles
- Sides made of painted sheet steel (colour (RAL7047)
- High power quick-release IP20 safety plugs conforming to DIN EN 61984:2009
- External dimensions: 1530 x 133 x 230mm (WxHxD)

Exemplary equipment for the power ducting

- 230V/50Hz AC power supply insert for supply of power and fuse protection
- socket panel unit 5x230V
- socket unit 2x 230V/16A for supplying power to computer equipment
- RJ45 patch panel for networking PCs
- Multimedia terminal panel insert for PC

4 FL1703 Recirculating Cooler

LM3920

1

Recirculating Cooler/Chiller for environmentally friendly cooling

The FL series offers a new generation of chillers for routine cooling applications within the laboratory and industry. The temperature stability of the PID control is $\pm 0.5^{\circ}\text{C}$. All units can easily be cleaned and are provided with a splash water proof keypad with LED temperature indication. On the front of the units there is an RS232 interface as well as an alarm shutdown. The filling port is easily accessible placed on the top under a lift-up cover. Another hinged tray serves as a file for the operating manual or other documents concerning the installation. The removable venting grid allows an easy cleaning of the condenser, the drain tap is easily accessible behind the grid. All models include an easily visible level indication. Another advantage is the venting slots are on the front and rear and therefore the units can be placed directly one beside the other (space saving).

Your advantages

- Ergonomic design and easy operation
- Splash-proof keypad with integrated mains switch
- Large, bright LED display
- Reliable Microprocessor PID temperature control
- Filling level indicator



- Powerful immersion pumps, suitable for continuous operation
- Permissible temperature in return line +80 °C
- Easy filling from the top with hinged protective lid
- Low liquid level protection with optical and audible alarm signal
- Integrated stainless steel bath tanks
- Removable venting grid for cleaning of the condenser
- Front drain
- No side vents
- RS232 interface for PC-connection
- IP class according to IEC 60529: 21
- Alarm output, potential-free change-over contact (max. 30 VA)
- Pressure Indicator
- By-pass valve to adjust pump pressure

Technical Data

- Working temperature range (°C): -20 ... +40
- Temperature stability (°C): ±0.5
- Setting / display resolution: 0.1 °C
- Temperature Display: LED
- Cooling capacity (Medium Ethanol) °C / kW :
20/1.7; 10/1.4; 10/1.4; 0/1; -10/0.75, -20/0.3
- Pump capacity flow rate (l/min): 40
- Pump capacity flow pressure (bar): 0.5-3.0
- Pump connections: G3/4"
- Barbed fittings diameter (inner dia. / mm): 3/4"
- Filling volume (liters): 12 ... 17
- Refrigerant: R404A
- Digital interfaces: RS232, Optional Profibus
- Ambient temperature: 5...40 °C
- Dimensions W x L x H (cm): 50 x 76 x 64
- Weight (kg): 91
- Suitable fluids: water, water-glycol mixture, JULABO Thermal bath fluids
- Included with each unit: 2 barbed fittings for tubing 3/4" inner dia. (pump connections G3/4" male)
- Cooling of compressor: Air