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Process and Chemical Engineering

Process Trainers automated with Process Control System



Process Trainers automated with Process Control System

High-quality training systems help you teach complicated processes from the process sector in a way that is understandable and features thoughtful educational design. This is the standard to which the process trainers from Lucas-Nülle have been developed. The systems are based on plant designs used in the process industry and are automated by means of an industrial process control system.

Compact, functional training systems have been designed for four essential processes: rectification, extraction, reactions and adsorption. They demonstrate the process in a way that is clear and also manage to achieve this within a very small space.

Each of the systems is supplied with a fully pre-configured process control system. No programming knowledge is required. Advanced users, however, still have the option to modify the programming. It is your choice!

IPT 21 Mixer-Settler 2-stage Extraction



IPT 21 Mixer-Settler 2-stage Extraction

If the separation of a product from a mixture by distillation is too complex or indeed entirely impossible, then extractive separation might be an economic alternative. In this case, the desired substance is dissolved out of the mixture using an extract. Then the product can be distilled out of the extract.

The process trainer *IPT 21 Mixer-settler* demonstrates this procedure, even allowing the separation by change of phase to be observed directly. The system is universally chemical stable.

The glass training system has two stages operating countercurrently. Both phases are fed into the appropriate stages using dosing pumps and mixed by means of agitators. The extraction products are collected in two separate receiver vessels.

The process trainer *IPT 21 Mixer-settler* is supplied with a complete, fully programmed industrial process control system. It is possible to connect multiple training systems with a single process control system. Lucas-Nülle will find a custom solution to your process engineering laboratory needs. Simply make contact with us about it.

Education objectives:

- Principle of ideal mixing stage
- Principle of reverse flow extraction
- Influence on efficiency of:
 - Stirrer speed frequency
 - Density difference
 - Throughput

Basic equipment set, consisting of:

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Pos.	Product name	Bestell-Nr.	Anz.
1	IPT21 Extraction, Mixer-Settler DN50 2-stage	LM3210	1

Apparatus:

- 2x Mixer-Settler Stage DN50 each with:
 - Double weir
 - Separating zone (L = 164 mm)
 - Separating bottle top with interior adjustment for dividing mirror
 - Laboratory stirrer with seal ring (0.12 kW, max 2000 rpm)
 - Turbine agitator (PTFE)
- 4x Receiver vessels DN300
 - Cylindrical vessel
 - Graduated 1 l
 - Nominal volume 20 l
 - Reduced neck (DN150)
 - Vessel lid with nozzles 1x DN15, 3x GL25, 1x GL45
- Magnetic dosing pump with continuous adjustment of stroke length and adjustable stroke frequency (17 W, 12 l/h)
- 2x Oval wheel meter with impulse output

Dimension:

height x width x depth: 2550 x 1650 x 1200 mm



Additionally required:

Pos.	Product name	Bestell-Nr.	Anz.
2	Process Control System SIMATIC PCS 7 AS RTX Box	LM3910	1

Main components in the example package:

- 1 x SIMATIC PCS 7 Automated System
- 1 x Peripheral System
- 1 x Power supply

Detailed description:

- 1x SIMATIC PCS 7 AS - PROFIBUS automation system
- Several signal input-output-devices, depending on the LN-process-trainer configuration. For example:
 - SIMATIC DP, HART Analog Input SM 331
 - SIMATIC S7/PCS7, SM 322 Digital Output Module
 - SIMATIC S7-300, Digital Output SM 322
 - SIMATIC S7-300, Digital Input SM 321
 - SIMATIC S7-300, Analog Input SM 331
 - SIMATIC S7-300, Analog Output SM 332



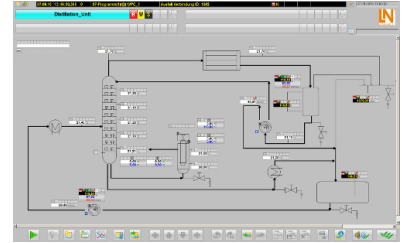
3 **Siemens Process Control System SIMATIC PCS 7 3-user license**

SO2806-1K

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- 1 x DVD: PCS 7 Software
- 1 x Paper: Certificate of License
- 1 x Stick: License Key USB Stick with 3 * FLOATING LICENSES

Only available for schools, colleges, universities and for in-house vocational training departments.



Provided by customer:

Personnel Computer with fulfilled hardware and software requirements.

Hardware Requirements

- **CPU:** Min. INTEL Core 2 Duo; > 2.4GHz, INTEL Core 2 Quad
- **RAM:** 4 GB (32-bit operating system) 6 GB (64-bit operating system)
- **HDD:** 200 GB HDD/SSD with 100 GB free on C:\
- **Network:** 2x RJ45 on-board gigabit Ethernet

Software Requirements

The following operating systems are supported in PCS 7

- Windows 7 Professional / Ultimate / Enterprise SP1 (64-Bit)
- Windows 10 Enterprise 2015 LTSC (64-Bit)

Additional software requirements

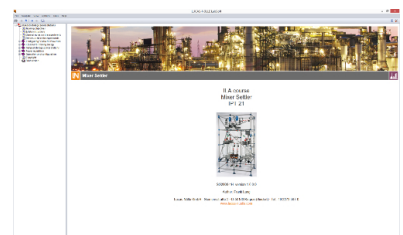
- Internet Explorer 11
- Microsoft .NET Framework

Media:



Pos.	Product name	Bestell-Nr.	Anz.
4	Interactive Lab Assistant: mixer-settler	SO2806-1C	1

Multimedia experiment software with instructions and documentation for the process trainer "mixer-settler".



Additionally recommended

Pos.	Product name	Bestell-Nr.	Anz.
5	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!

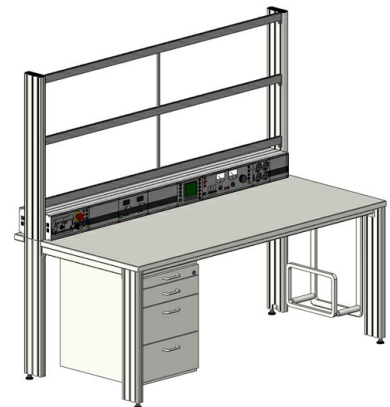
Laboratory bench

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