

LINSEIS

pushing boundaries

H2 SAFETY BOX

Gas Safety **System**



Since 1957 LINSEIS Corporation has been delivering outstanding service, know-how and leading innovative products in the field of thermal analysis and thermo-physical properties.

Customer satisfaction, innovation, flexibility, and high quality are what LINSEIS represents. Thanks to these fundamentals, our company enjoys an exceptional reputation among the leading scientific and industrial organizations. LINSEIS has been offering highly innovative benchmark products for many years.

The LINSEIS business unit of thermal analysis is involved in the complete range of thermoanalytical equipment for R&D as well as quality control. We support applications in sectors such as polymers, chemical industry, inorganic building materials, and environmental analytics. In addition, thermophysical properties of solids, liquids, and melts can be analyzed.

Rooted in a strong family tradition, LINSEIS is proudly steered into its third generation, maintaining its core values and commitment to excellence, which have been passed down through the family leadership. This generational continuity strengthens our dedication to innovation and quality, embodying the essence of a true family-run business.

LINSEIS provides technological leadership. We develop and manufacture thermoanalytic and thermophysical testing equipment to the highest standards and precision. Due to our innovative drive and precision, we are a leading manufacturer of thermal analysis equipment.

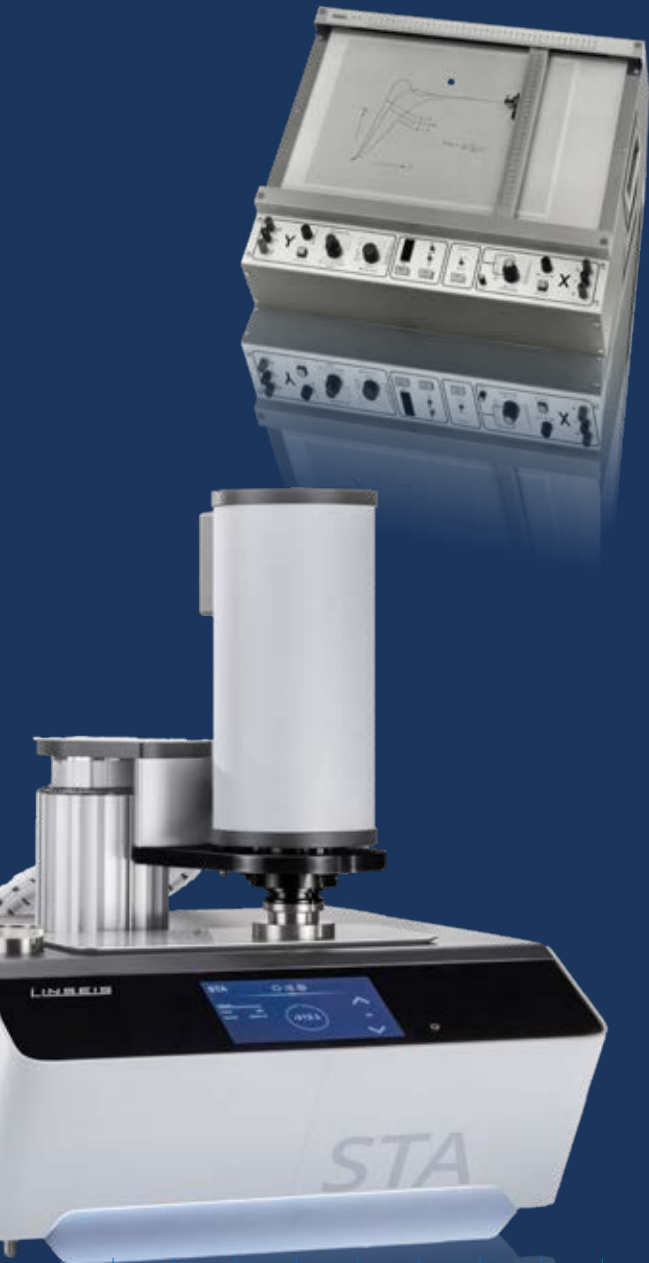
The development of thermoanalytical testing machines requires significant research and a high degree of precision. LINSEIS Corp. invests in this research to the benefit of our customers.

C L A U S L I N S E I S
C E O D I P L . P H Y S .



The strive for the best due diligence and accountability is part of our DNA. Our history is affected by German engineering and strict quality control.

We want to deliver the latest and best technology for our customers. LINSEIS continues to innovate and enhance our existing thermal analyzers. Our goal is to constantly develop new technologies to enable continued discovery in Science.



Engineering & Innovation

GAS SAFETY SYSTEM

Working with hydrogen, carbon monoxide, chlorine and many more

The safety system works automatically and supports you when working with hydrogen and other flammable or toxic gases. The sensors of the system detect leaks and can automatically purge the instrument.

System operation

- **completely automated preparation** of gas atmosphere including evacuation
- **purge gas inlet pressure is monitored** if gas runs low - chamber will be fully purged before the gas runs out
- system comes with a UPS for automatically purging the system **in case of a power outage**
- integrated burn-off unit with two independent igniters (only for flammable gases) and electrical current monitoring
- flashback arrestor valve integrated into outlet path
- vacuum level is monitored through two independent sensors during pumping to ensure low remaining oxygen levels
- chamber can be filled with programmable inert and sample-gas mixtures within a short time
- integrated 3-channel MFC with monitored set / is flow deviation for issuing an emergency purge if sample /auxilliary gas runs out
- system locks / unlocks lift / lower supply etc. independently from the main system
- **system works independently from PC** - in case of PC communication issues the safety system can react autonomously
- **high precision safety valve maintains overpressure in the chamber** - in case of a pressure drop an emergency purge is issued
- all parameters monitored for plausibility during operation
- gas outlet blockage detection

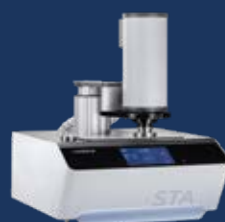


Compatible devices

The safety system is mainly used by our customers in **thermobalances** and **dilatometers**.

The system can be adjusted to different gases. We take these into account in the production of our system.

On request it is also possible to use the system for other Linseis measuring instruments. Please contact us!



STA PT 1600



DIL L75 HORIZONTAL

How the system works



- **Sensors are also placed around and above the device to detect possible leaks**
- **Sensors can be prepared for different gases (H2, CH4, CO, CL2 and others)**

When switching on the safety system, first it will check whether the communication to the AD converter is working.

All analog values are additionally checked via comparators. The burn off unit is turned on in case the gas room monitor reports a safe condition.

The safety device is now in standby mode. The furnace lift is now released for opening.

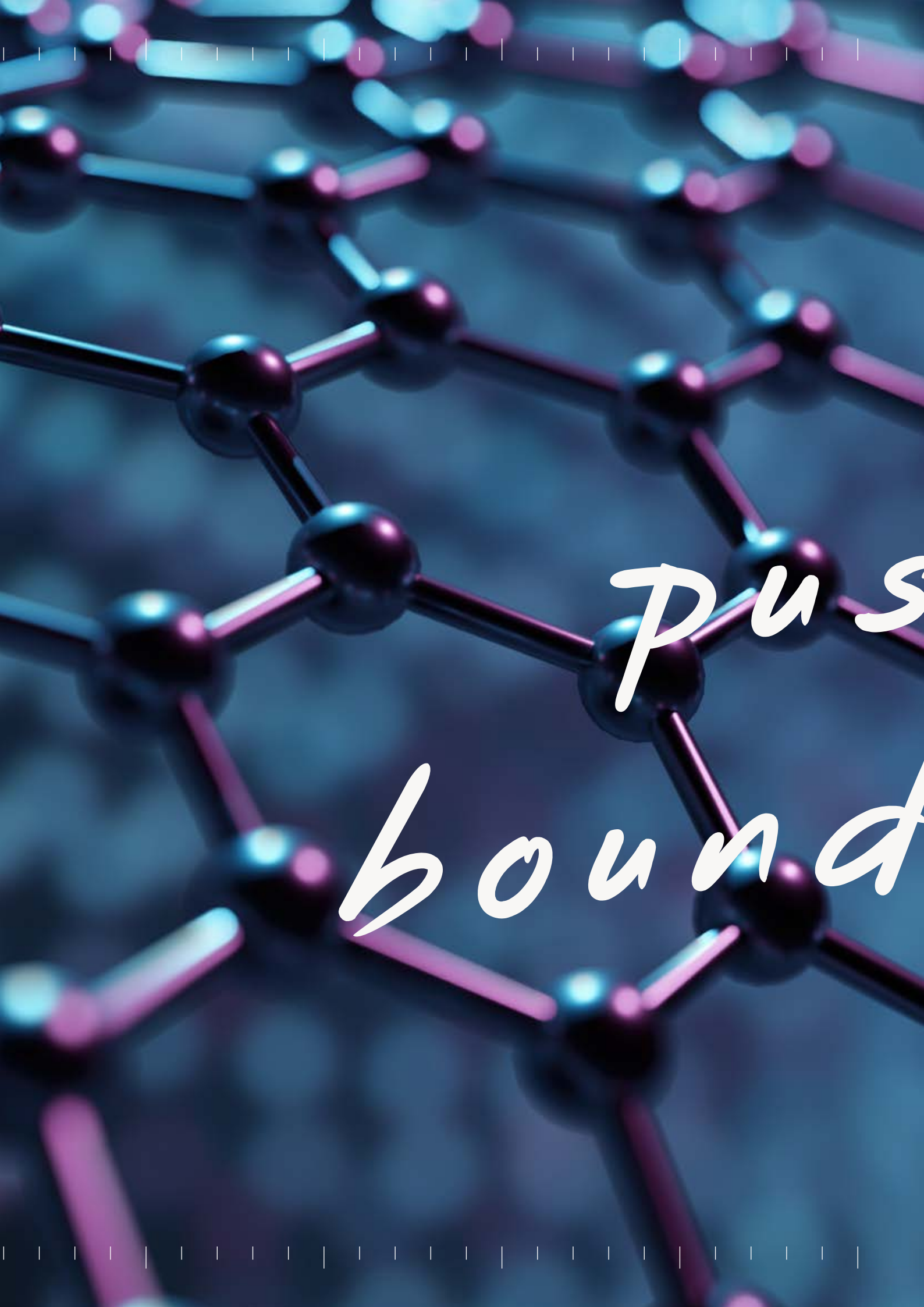
When the sample is inserted the gas cycle can be started. The chamber will be purged.

The operating pressure switch and relative pressure sensor are checked again. The vacuum pump is now vented. The chamber is first evacuated via the vacuum bypass with the backing pump.

System will be automatically purged in the event of:

- an empty gas cylinder
- an empty N2 cylinder (if the pressure drops below 4 bar threshold)
- one burner failing
- power outage
- furnace cooled down too quickly and there was no longer sufficient overpressure in the chamber

The chamber is then purged with inert gas for 3 minutes (this corresponds to approximately 10 times the chamber volume).



Plus
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Features

H2 Safety Box **Ultimate**

Evacuation	Fully automatic drain including all necessary valve controls. Bypass valve with reduced cross-section prevents the sample from being sucked out.
Filling	Automatic filling with inert gas, a sample gas or an adjustable mixture of both gases. The duration of filling is monitored and aborted in the event of an error. The filling process is stopped automatically when the operating pressure is reached.
Redundant sensors	Many parameters are monitored by redundant sensors (overpressure, vacuum, pressure switch).
Monitoring the operating pressure	If the pressure falls below the operating pressure during the measurement, e.g. due to a leak, the system is flushed and the measurement is stopped. This is detected by two independent sensors.
Monitoring the purge gas supply	Monitoring of the purge gas supply by two independent pressure switches. The system can trigger an emergency purge if the inert gas supply runs out.
Monitoring the flushing process	Bottle pressure and pressure in the system are monitored during the flushing process. This ensures that the flushing process has been successfully completed
Electric locking	As long as the system is not in a safe state, the oven cannot be opened (does not apply to pressurized systems that require screws for sealing) and no heating process can take place
Cooling water monitoring	Measurement is stopped if there is insufficient cooling water and flushed until a safe state is reached
Safety in the event of a power failure	Equipped with a UPS for automatic, controlled emergency purging. In systems with a flare unit, a burner is kept at temperature until a safe state is reached
Two independent igniters	Integrated flaring unit with two independent igniters for flammable gases possible. Alternatively, flue gas line with inert gas purging to prevent back diffusion. Insufficient inert gas supply is detected.
Blockage detection	If the outlet pipe is blocked, the flushing or measuring process is stopped automatically. The user is warned and an alarm is signaled visually and acoustically.
Monitoring the gas flows	Flow deviations of the mass flow controller are monitored and trigger an emergency flush
Self-sufficiency	Works independently of the PC, reacts autonomously to communication failures.
Plausibility check	Numerous parameters and measured values are monitored for plausibility during operation.
Operating error protection	Protection through automated systems and monitoring.

H2 Safety Box **Basic**

Evacuation	Purely manual evacuation. All valves must be operated manually, the pump must be switched on manually. Incorrect operation is possible
Filling	Filling via manual bypass valve. Filling process must be stopped manually as soon as operating pressure is reached.
Redundant sensors	Analog pressure gauge and vacuum tube must be read by the user. No redundant sensors in the event of incorrect measurement due to incorrect measurement of the vacuum tube (Pirani tube measures incorrect values depending on the gas) or defective vacuum tube
Monitoring the operating pressure	A drop in operating pressure is not detected
Monitoring the purge gas supply	Inert gas supply is not monitored. In the event of a fault, the system cannot be purged
Monitoring the flushing process	Flushing process is not monitored.
Electric locking	No locking
Cooling water monitoring	Measurement is stopped if there is insufficient cooling water and flushed until manual intervention or until the inert gas cylinder is empty
Safety in the event of a power failure	Gas supply is interrupted and the system is stopped and purged until manual intervention, or until the inert gas cylinder is empty
Two independent igniters	Exhaust gas line with inert gas purging to prevent back diffusion. However, a lack of inert gas supply is not detected
Blockage detection	A blocked outlet is not detected
Monitoring the gas flows	Flow deviations are not detected
Self-sufficiency	Purely passive system, there is no communication with the PC
Plausibility check	No monitoring of sensor values.
Operating error protection	No protection against incorrect operation, danger due to inadequate evacuation.

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09/2024