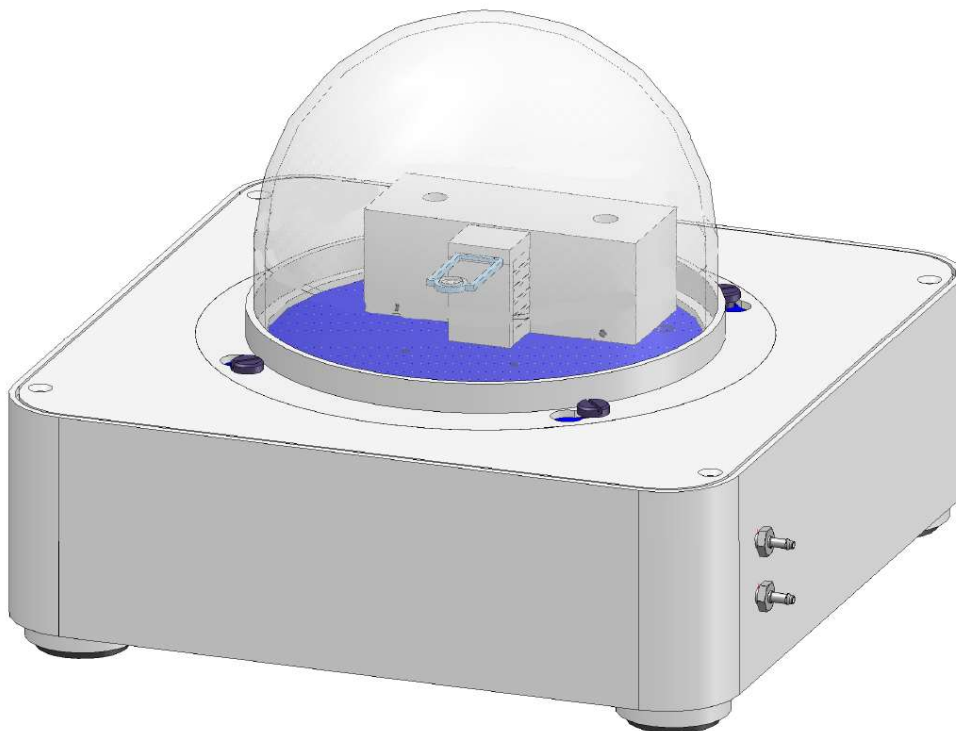


How To Use gases with Chip DSC



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Stand: 25.08.2021

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1. General information

This manual is a short description for handling measurements with the Chip DSC in combination with gases. The presented features are the most common, that are usually used. However, the usage of different atmospheres must fit for specific investigations. For more Information, read the other available instructions or specific manuals for the Chip DSC.

2. Gases you can use

Information concerning the possibility of using various gases can be found in the appropriate technical literature or can be requested from the manufacturer or retailer of gases.

The following is a selection of purge gases including their limiting properties. The list makes no claim on being complete.

2.1 Common gases

Gas	Properties
Helium (He)	Chemically inert (inert gas) No technical safety limitations
Argon (Ar)	Chemically inert (inert gas) Asphyxiating No technical safety limitations
Nitrogen (N ₂)	Largely inert Asphyxiating No technical safety limitations, but sample reactions are possible in the high temperature range.
Air	Oxidizing No technical safety limitations, but sample reactions are possible. Application is possible above room temperature (maximum application temperature is determined by furnace material, sample holder, thermocouple).

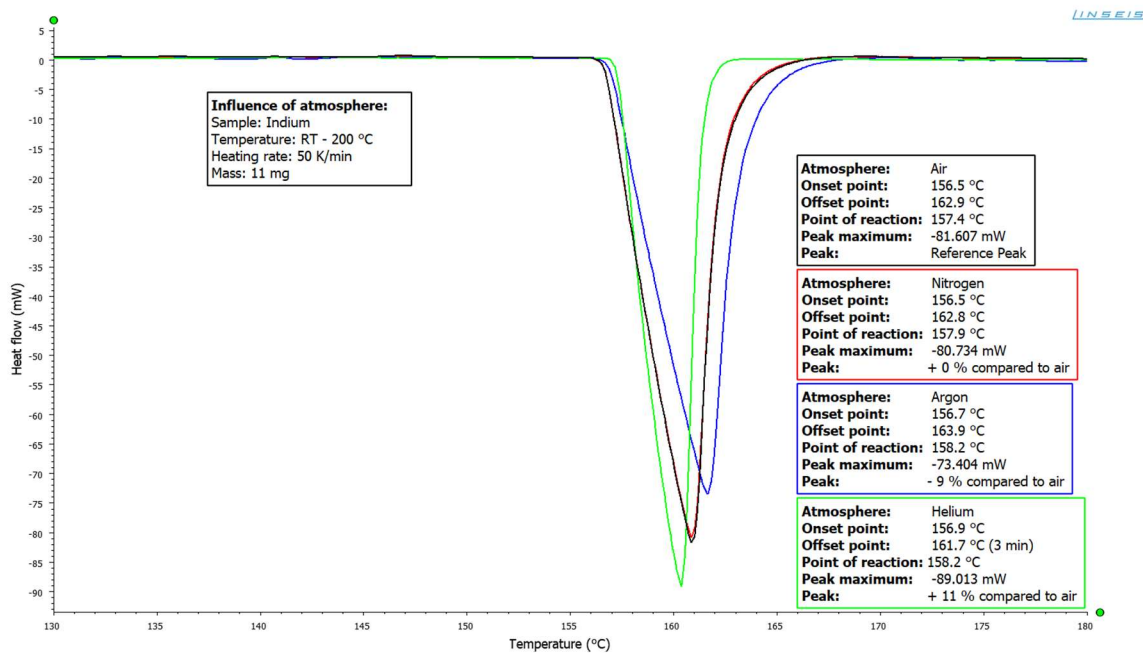
2.2 uncommon gases

Gas	Properties
Oxygen (O ₂)	Increases flammability (must not come into contact with fats or oils) No technical safety limitations, but sample reactions are possible. Application is possible above room temperature (maximum application temperature is determined by furnace material, sample holder, thermocouple).
Carbon dioxide (CO ₂)	Non-toxic (MAK- value 5000 vpm), Non-flammable Application is possible above room temperature.
Hydrogen (H ₂)	Flammable, Danger of explosion when in contact with oxygen The use is not allowed for safety reasons.
Ammonia (NH ₃)	Toxic (MAK value 50 vpm) Flammable Danger of explosion when in contact with oxygen. Corrosion of seals is possible. The use is not allowed for safety reasons.
Carbon monoxide (CO)	Toxic (MAK-Wert 10 vpm), Flammable Corrosive The use is not allowed for safety reasons.
Hydrogen sulphide (H ₂ S)	Toxic (MAK value 10 vpm), Flammable, corrosive The use is not allowed for safety reasons.

3. Influence of gases on the measurement

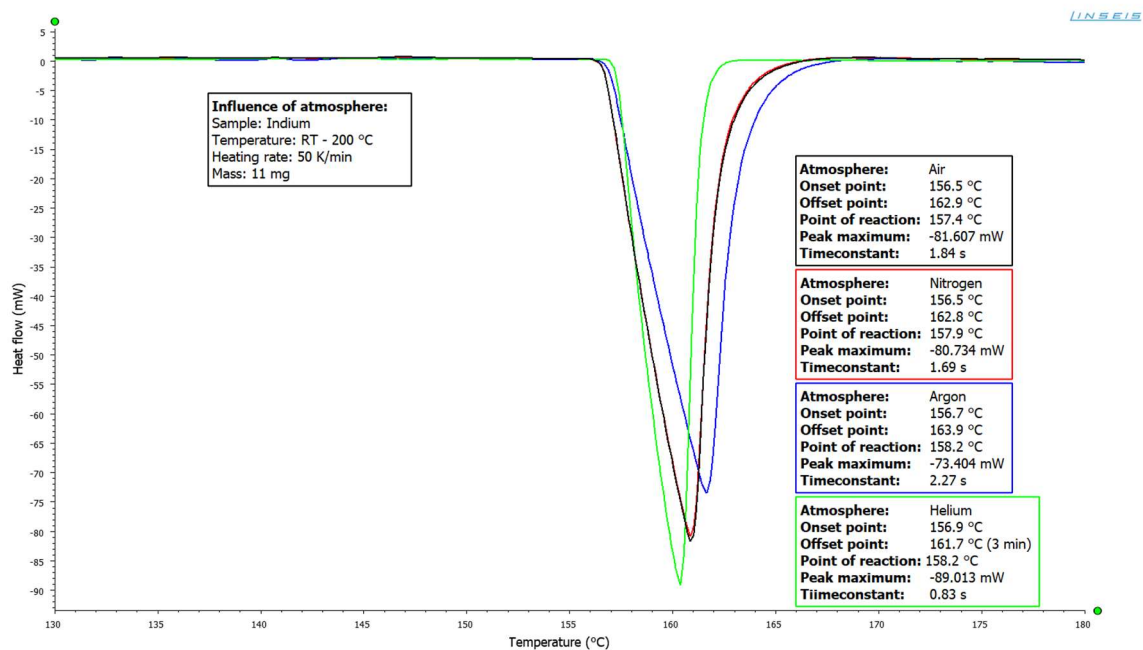
3.1 sensitivity

- Helium is good for good sensitivity because of better heat transfer (11% higher peak)
- Argon is good to avoid convection because of bad heat transfer (9 % smaller peak)
- Nitrogen is good for similar results like air



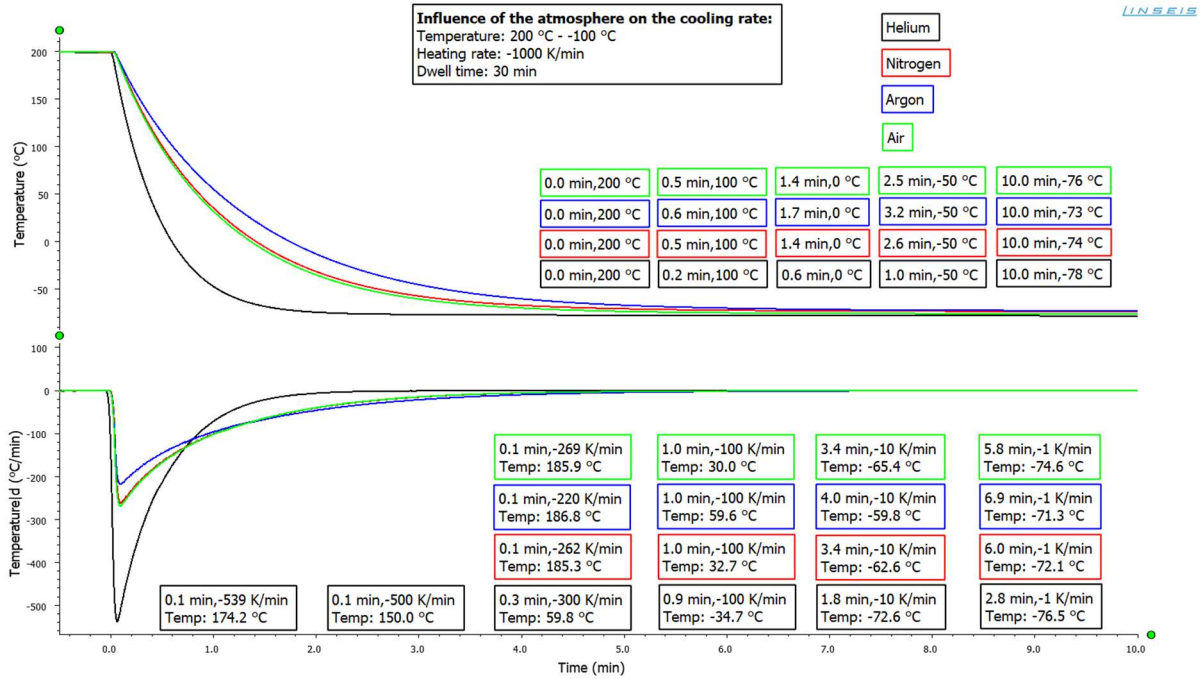
3.2 timeconstant

- Helium is good for smaller timeconstant because of better heat transfer
- Argon is good to avoid convection because of bad heat transfer
- Nitrogen is good for similar results like air



3.3 cooling rate

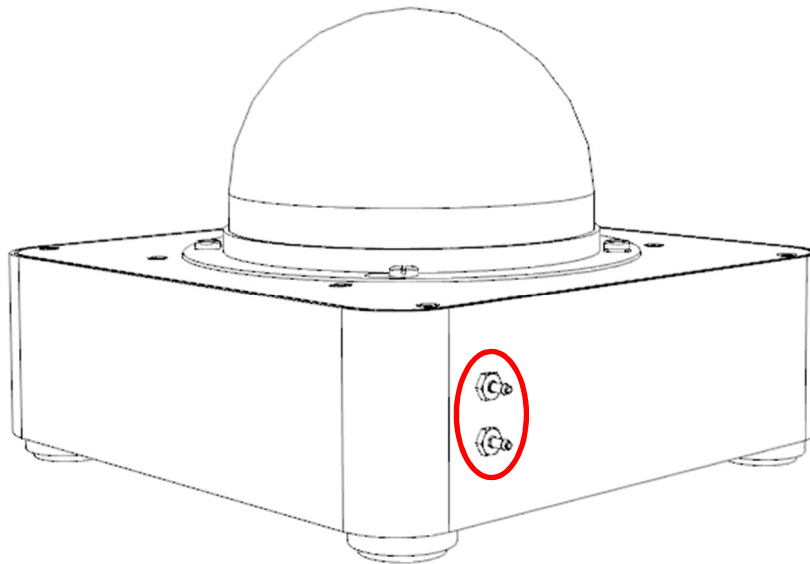
- Highest cooling rates with He
- N and Air are physically almost identical
- Ar shows the slowest cooling rate because of bad heat transfer
- -10 K/min are possible up to -72 °C using Intracooler and Helium



4. Hardware

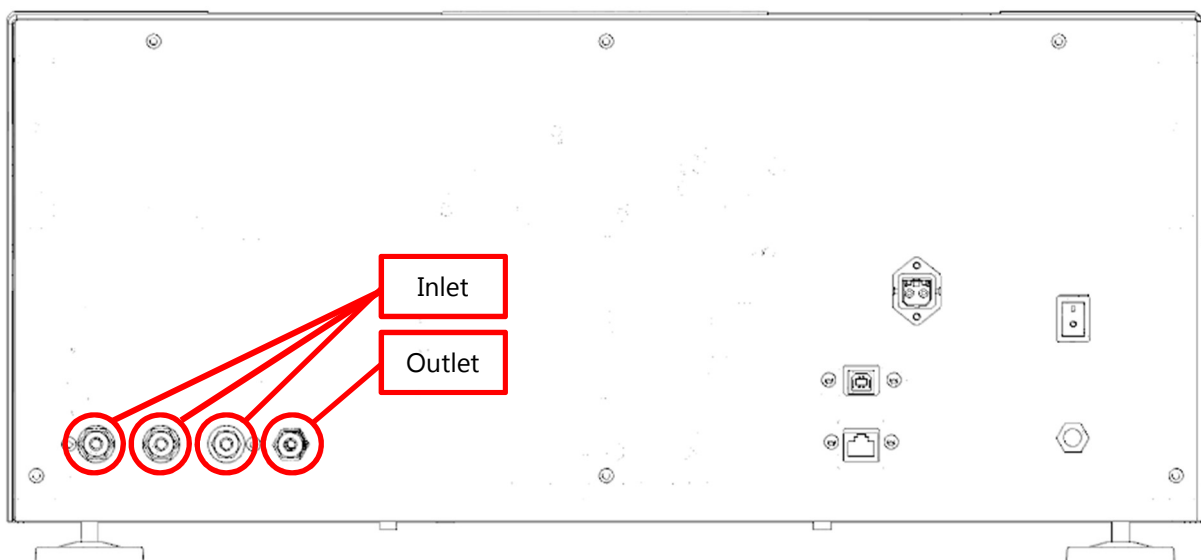
4.1 Chip-DSC 1 | Chip-DSC 10

- Put over the gas tubes at the connectors at Chip-DSC
- Fix tube with cable tie
- Inlet and outlet are symmetric



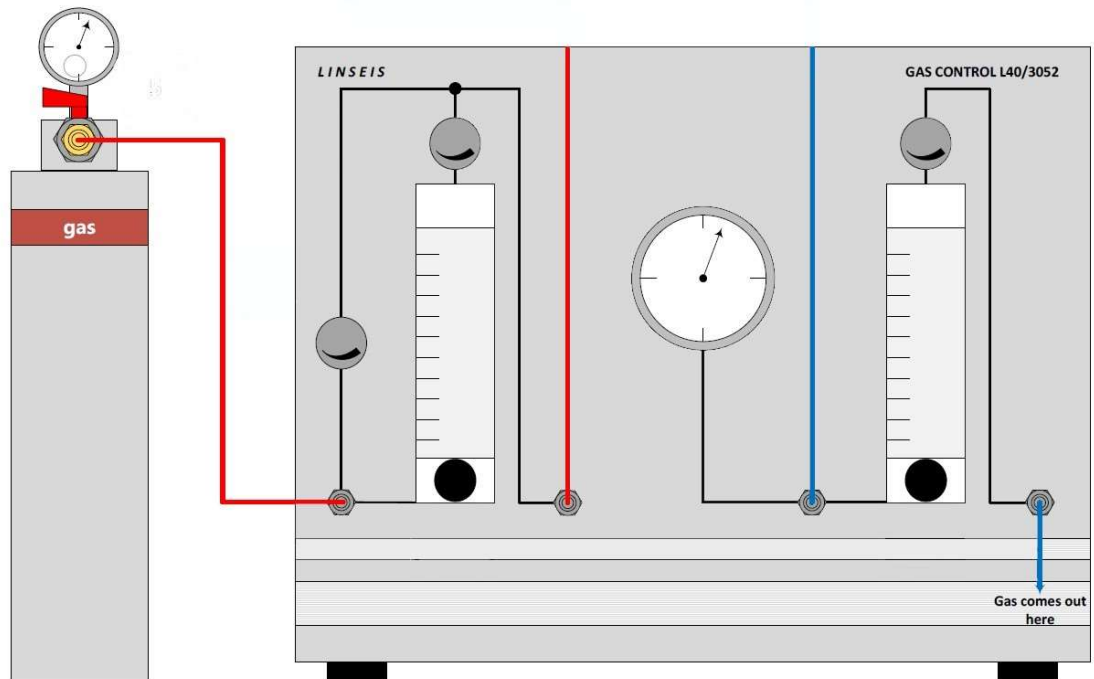
4.2 Chip-DSC 100

- Connect gas inlet to inlet at rear side of the device
- Close unused inlet connections with blind plug
- Connect has outlet to outlet at rear side of the device
- Tighten the nuts (counter the receptacles)



4.3 manual gas control

- Connect the gas inlet tube of the device with the outlet of the manual gas control
- Connect the gas bottle or available gas source with the inlet of your manual gas box
- Tighten the nuts (counter the receptacles)
- Close all valves



4.4 MFC

- Connect the gas inlet tube of the device with the outlet of the MFC
- Connect the gas bottle or available gas source with the inlet of your MFC
- Tighten the nuts (counter the receptacles)
- Setup the gas profile at your software (Check software manual for further information)