gazex®
Warsaw

GAS TEST SET
for testing GAZEX detectors
USER MANUAL
Edition 6v2025

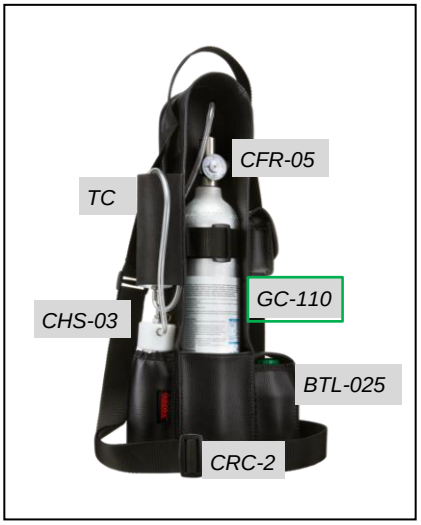
GTS
Series [2025]

INTENDED USE

Gas Test Sets (GTS) are designed to verify the accuracy of operation of GAZEX® detectors, types: DEX, DG, WG – by introducing a test gas mixture into the detector's measuring chamber.

Standard GTSs contain all necessary components required for a complete gas testing reaction of detectors of a specific type for low-reactive gases (e.g., methane, propane, carbon monoxide, carbon dioxide, hydrogen):

- TC test cap: designed for introducing test gas into the measuring chamber of a specific detector type;
- CHS-03 test gas humidifier: (*necessary only when testing detectors with semiconductor sensors*);
- BTL-025 250ml humidifier solution container: (*factory-filled with 100g NaCl solution*);
- CFR-05 low-reactive gas reducer: with a constant flow rate of 0.5 l/min; includes a pressure gauge for manual mounting on a 110-litre capacity disposable cylinder of test gas;
- flexible tubes for low-reactive gases (*connecting the test cap to the humidifier and to the reducer's outlet fitting*);
- CRC-2 case/bag for the transport and convenient carrying of the entire set.



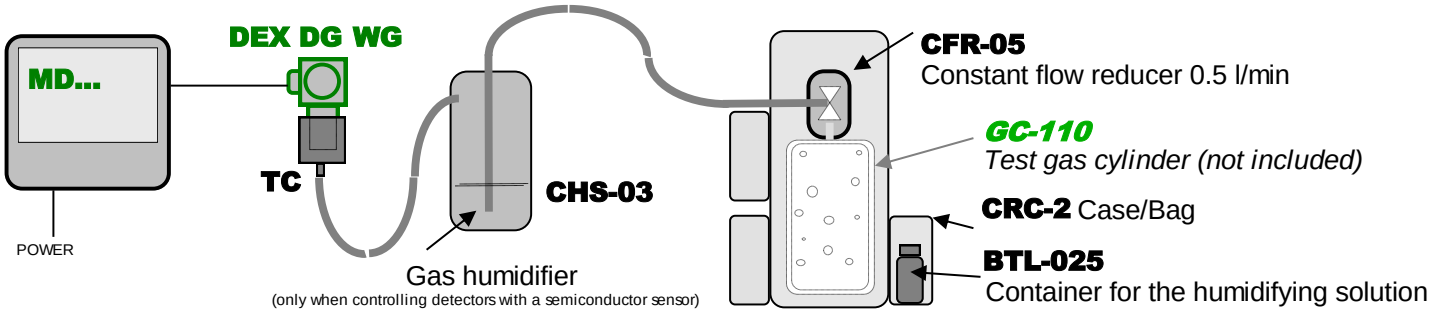
A natural supplement to the GTS is the disposable GC-110 gas cylinder, containing one of the test gases (listed in the table below). The cylinder has an approximate capacity of 110 litres of gas mixture (aluminium, with a water capacity of approximately 1.7 litres) and comes with a user manual label attached.

WARNING: GTSs <u>are not</u> optimised for introducing mixtures containing highly concentrated reactive gases or vapours of organic compounds.

RANGE OF APPLICATIONS

- GTS-DEX = For DEX-type detectors (*manufactured after 2002*) – including DEX/F, DEX/P, and DEX/A;
- GTS-DG = For DG-type detectors (*manufactured after 2002*) – including DG/F, DG/P, DG/PV, and DG/M;
- GTS-WG = For WG-type detectors (*manufactured after 2006*) and others equipped with MS-WG sensors – including: WG-*nn*.NG, WG-*nn*.EN, WG-*nn*.EG, WG-*nn*.EGx, DG-*nn*.EN, DG-*nn*.EN/M

RECOMMENDED GAS TEST CONFIGURATION SCHEME



SET COMPONENTS

Model	Test cap	Gas humidifier	Reducer	Case/bag
GTS-DEX	TC-DEX (with 1.5 m tube for low-reactive gases)	CHS-03* (polycarbonate, approx. 300 ml; with 0.5 m tube for low-reactive gases), BTL-025 (extra humidifier solution container) * – only for testing detectors with semiconductor sensors	CFR-05** (for disposable 110-litre cylinders; constant flow of 0.5 l/min; for low-reactive gases; with pressure indicator on the cylinder) ** – allowed for conditional use with GC-110-H2S and GC-110-NH3	CRC-2 (black, leather-like material; space for cylinder, reducer, test cap, and flexible tube; pouch for humidifier solution container and for reducer box; adjustable shoulder strap)
GTS-DG	TC-DG (with 1.5 m tube for low-reactive gases)			
GTS-WG	TC2-WG (with 2 m tube for low-reactive gases)			

Test gas cylinder selection

- GC-110-CH4 (methane: 2.2% vol. in synthetic air = 50% LEL);
- GC-110-C3H8 (propane: 0.85% vol. in synthetic air = 50% LEL);
- GC-110-CO (carbon monoxide: 200ppm in synthetic air);
- GC-110-H2 (hydrogen: 2% vol. in synthetic air = 50% LEL);
- GC-110-H2S (hydrogen sulfide: 25 ppm)
- GC-110-NH3 (ammonia: 100 ppm in synthetic air)
- GC-110-CO2 (carbon dioxide: 2 %vol.)

(disposable, ~110 litres of test gas, water capacity: ~1.7 l; user manual on label)

*All the above components are **<u>ALSO AVAILABLE SEPARATELY</u>**, allowing for a customised set configuration tailored to the Client's needs.*

WARNINGS concerning the use of GC-110 cylinders

- before using the cylinder, verify the conformity of the test gas parameters on the label affixed to the cylinder and the data provided in the manufacturer's QUALITY CERTIFICATE included with each cylinder, against the alarm thresholds or measurement ranges of the detector being tested;
- before using or transporting the GC-110 cylinder with test gas, consult the SAFETY DATA SHEET for the respective test gas available at www.gazex.pl;
- store and use the cylinder in a well-ventilated area;
- the cylinder contains compressed gas under high pressure – do not puncture the container, do not heat the cylinder, and do not use/store it at temperatures exceeding +50°C;
- avoid contact of the cylinder contents with eyes and skin;
- do not inhale the cylinder contents – *this applies particularly to cylinders containing carbon monoxide, hydrogen sulfide, or ammonia mixtures*;
- keep the cylinder out of reach of children;
- the cylinder is designed to operate exclusively with specified flow adjusters (e.g., CFR-05 reducer) – do not use adjusters designed for lower pressures than those present in the cylinder;
- the cylinder is SINGLE-USE ONLY – it is not suitable for refilling and must be disposed of properly.

FIRST AID (*applies to users of GC-110-CO cylinders with carbon monoxide, GC-110-H2S with hydrogen sulfide, or GC-110-NH3 with ammonia*) – If the gas mixture from the cylinder has been inhaled for longer than approximately 5–10 minutes, or if there is reason to suspect such exposure, place the affected individual in fresh air in a position that facilitates breathing, and seek medical assistance.

GC-110 cylinders containing explosive gas mixtures hold these gases at concentrations defined as 50% of the Lower Explosive Limit (LEL), meaning they do not pose a risk of creating explosive atmospheres in enclosed spaces at any time!

USAGE INSTRUCTIONS

The method of using the set depends on the type of gas sensor in the tested detector:

TESTING A DETECTOR with a SENSOR MODULE: semiconductor sensor – indicated on the yellow calibration label: **MS- *nn*/N** **WARNING**:The threshold concentration values of the tested detector should not exceed 80% of the test gas concentration in the cylinder.	TESTING A DETECTOR with a SENSOR MODULE: catalytic sensor – indicated on the yellow calibration label: **MS- *nn*.K…**, **MS- *n*K/N, MS- *n*KL/N** or **MS- P*n*, MS- P*n*K/N, MS- P*n*KL/N** electrochemical sensor – indicated on the yellow calibration label: **MS- *n*E…** or **MS-P*n*E…** ; optical InfraRed sensor – indicated on the yellow calibration label: **MS- *nR…*** or **MS-P*n*R…**
(*where **n** denotes a natural number representing the code of the detected gas*)	(*where **n** denotes a natural number representing the code of the detected gas*)
The test gas should be humidified by passing it through the CHS-03 humidifier.	Humidification of the test gas is not necessary.
Gas testing should only be conducted once the GC-110 cylinder has reached the same temperature as the detector's surroundings. Ensure that the CFR-05 reducer valve is closed (to close the valve, rotate the valve knob clockwise), and that all fittings are completely clean. Do not use the reducer if it shows any signs of damage!	
Attach the CFR-05 reducer to the GC-110 gas cylinder manually, without the use of tools. Tighten the reducer into the cylinder socket by rotating clockwise until the pressure gauge on the reducer displays the gas pressure in the cylinder. If the pressure gauge reads below 2 bar, the cylinder is practically empty and should not be used. *WARNING: The CFR-05 reducer is made of nickel-plated brass and is designed for standard test gases in GC-110 cylinders offered by GAZEX. If using other cylinders with low- or high-concentration reactive gases, an appropriate reducer made of stainless steel must be used!*	
Pour 200 ml of clean water into the container with humidifying solution (BTL-025, which contains 100 g of NaCl by default). Mix until the salt is nearly completely dissolved (the presence of salt crystals indicates saturation of the solution). Pour enough of the prepared solution into the CHS humidifier so that the solution level falls between the minimum and maximum marks. Secure the lid of the humidifier. IMPORTANT: A humidifier containing the solution should only be transported and used in an **upright** position.	Connect the test cap TC (appropriate for the detector type) to the outlet fitting of the CFR reducer using a tube. Select the tube type according to the test gas. For low-reactivity gases, use the standard 1.5 m tube from the GTS. This tube can also be used for test gases from GC-110-H2S and GC-110-NH3.

Connect the inlet fitting (top) of the humidifier to the CFR reducer fitting with a tube.	For low- or high-concentration reactive gases, use a 0.5 m tube designed for reactive gases (*e.g., from the standard equipment of TC-DEX and TC-DG test caps offered by GAZEX*).
Connect the outlet fitting (side) of the humidifier to the TC test cap (appropriate for the detector type). WARNING: Do NOT allow the humidifying solution to enter the tube connecting to the TC-DEX cap – this may lead to moisture ingress and temporary clogging of the detector's porous sinter.	

Attach the test cap TC to the detector sensor cover – follow the steps below, as illustrated in the photographs:

TC-DEX

TC-DG

TC2-WG

Attaching the TC2-WG test cap:
- Press the metal lever of the pliers/grip.
- Insert the end of the test cap with the gas tube into the vent opening until it reaches its limit (ensuring that the side plate at the grip completely covers the vent opening).
- Release the grip lever to lock the gas tube end in place and prevent it from slipping out of the detector's vent opening.

Open the reducer valve by turning the valve knob anti-clockwise (approximately half a turn). The CFR-05 reducer has a built-in mechanism that regulates the gas flow rate to approximately 0.5 l/min.

After approximately 1 minute from opening the valve, the gas will fill the humidifier and the test cap. Bubbles should appear continuously in the humidifier solution (indicating that the solution is 'bubbling').	After approximately 20 seconds, the gas will fill the test cap.

If the detector is functioning correctly, and the concentration and type of test gas are suitable for the detector, and the test is conducted correctly: The alarm module (MD…) connected to the detector should trigger an alarm when the relevant threshold is exceeded or display an increase in gas concentration.

After the test, close the reducer valve by turning the valve knob clockwise until resistance is felt. Avoid overtightening, as this reduces the reducer's lifespan.

If the GTS will not be used within the next 15 minutes, remove the CFR reducer from the cylinder (to prevent minimal technological leaks and test gas mixture loss). The GC-110 cylinder is equipped with an internal self-sealing valve that closes automatically upon removing the reducer.

Store the CFR-05 reducer in a tightly sealed plastic bag to protect it from dust and moisture, in its dedicated pocket/box. Avoid: violent shocks, contaminating the inlet and outlet fittings, and exposing it to temperatures below -30°C or above +60°C.

Pour the solution from the humidifier back into its storage container. Rinse the humidifier lid and tubes with warm water.	

OPERATIONAL NOTES for the GTS

- Protect the set from dust, moisture, or exposure to water.
- Protect the CFR reducer from damage or contamination.
- Keep the test cap (TC), humidifier (CHS), and the interiors of gas tubes impeccably clean.
- Do not use any chemical agents to clean the TC, CHS, or gas tubes—use only clean, warm water.
- When storing gas hoses in the pouches of the carrying case, ensure they are not bent or kinked (coil them gently in smooth loops).
- Before each transport of the GTS, inspect: the condition of the shoulder strap, the state of the Velcro straps, and the secure attachment of the GC cylinder to the carrying case.
- Regularly check the tightness of the BTL-025 container for the humidifying solution.
- If the humidifying solution is depleted, prepare a new batch using pure table salt (refined).

PRODUCER:
gazex®
GAZEX
Baletowa 16, PL 02-867 Warsaw, POLAND
Tel: +48 22 644 2511 gazex@gazex.pl
www.gazex.com

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