

Session 1

Gas service pipe and in-house installation technologies in Germany

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Gas service pipe and in-house installation technologies in Germany

Basis: DVGW-TRGI G 600

Gas installations in Germany

Technical requirements:

Material and component requirements

- DVGW certification
(state of the art)

Installation work

- DVGW G 600 / TRGI
(high temperature resistance requirements, gas flow switches, thermal cut-off devices...)

Requirements to be met by installation contractor

- Approval by network operator

Requirements to be met by network operator

- G 600 (TRGI)
- G 1020 (draft)



Operation & maintenance, gas installation, system operators

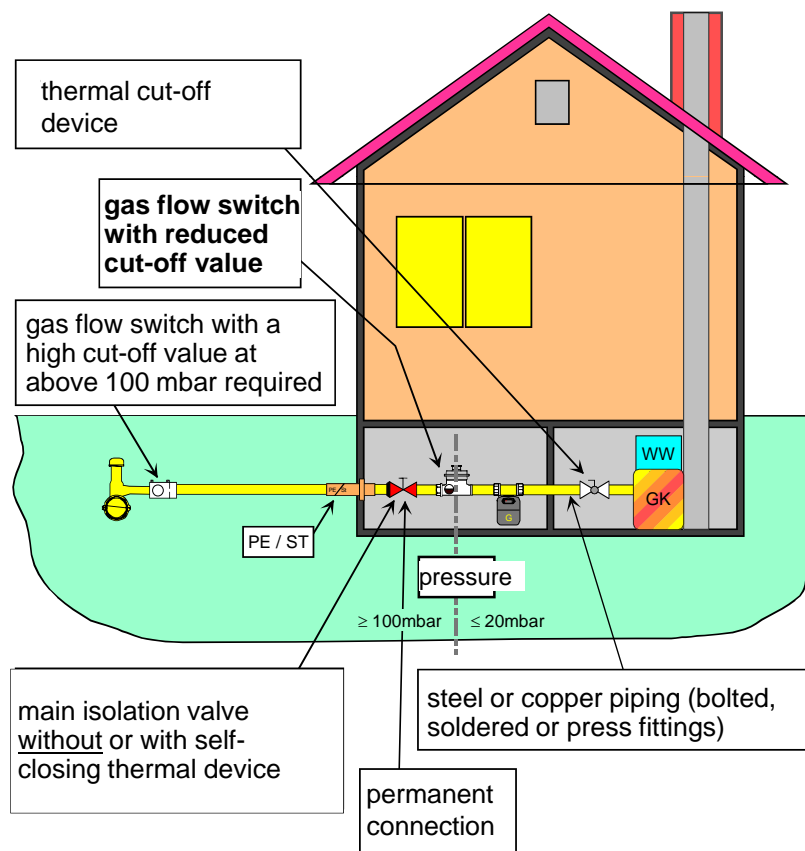
A gas installation designed and built to comply with statutory as well as DVGW-TRGI requirements provides the basis for proper, long-lasting operation.

According to Section 13 of the German Low Pressure Connection Ordinance (NDAV), the operator (legal person for whom the connection is made) is responsible for the proper condition of the gas system downstream of the main isolation valve with the exception of gas pressure regulators and metering devices that do not belong to him (general duty of occupier to make land and/or premises safe for persons or vehicles).

The operating and maintenance instructions in DVGW-TRGI provide the operator with the necessary information on how to comply with this duty.

Source: DVGW-TRGI G 600

Installation example of single-family home with a basement

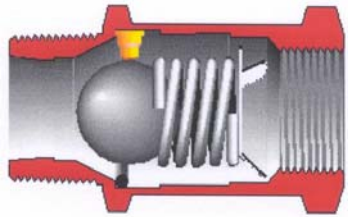
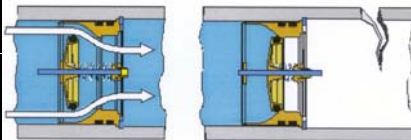
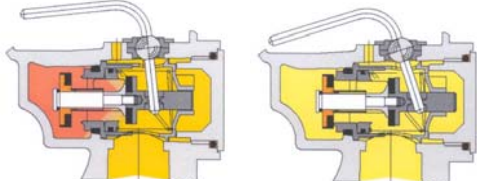


Gas-fired boiler with hot water storage tank located in basement; gas line secured with gas flow switch at the tapping tee; gas pressure regulator inside building

For pressures above 25 mbar it is mandatory in Germany to install gas flow switches in the service line.

WW = hot water
GK = gas-fired boiler

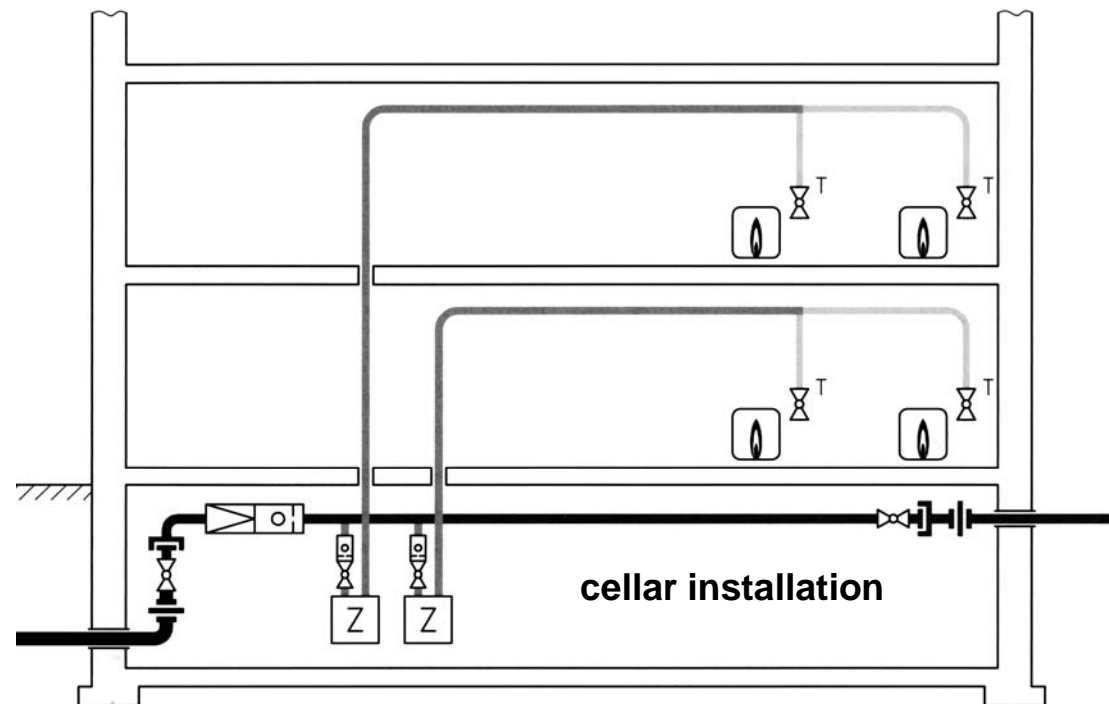
Components to increase safety in gas distribution systems / installations

Components	Thermal cut-off device	Gas flow switch	Pressure regulator with integrated gas flow switch
Sectional view			
Function	<p>The thermal cut-off device closes when a specified temperature of 90-120 °C is reached, isolating downstream gas equipment not designed for higher thermal loads. A fusion element acting as a temperature sensor locks the spring-loaded sealing element in place. When the activation temperature is reached, the fusion element will release the closing mechanism.</p>	<p>The gas flow switch works like a slam-shut valve. It is activated by a differential pressure. When a specified flow rate is reached, the differential pressure increases to above the counter-acting force of the spring and the flow switch will close. Depending on the flow switch function, it is installed either in the service line to the building or inside the building.</p>	<p>The newly developed gas pressure regulator rated up 4 bar uses the low gas flow cut-off mechanism also as a gas release limiting valve. If the valve's performance range is exceeded, the pressure regulator cuts off the gas flow thereby preventing what may be an unwanted gas release into the building. Thus the pressure regulator also performs the gas flow switch function.</p>

Webing
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Piping system

Multi-family home, gas meter in cellar, connection via service line serving additional apartments in back building



Z = meter

Operating and test pressures for gas installations in Germany

	MAOP	Test pressures	
		Load test	Tightness test
DVGW / TRGI	up to 100 mbar	1 bar	150 mbar
G 600	above 100 mbar up to 1 bar	combination test at 3 bar	

Operator responsibilities (1)

All in-house piping downstream of the main isolation valve is the responsibility of the operator.

DVGW-TRGI G 600 requirements:

- In-house piping must be protected against damage due to mechanical, chemical and thermal stresses.
- Proper, stable piping support must be ensured at all times.
- If in-house lines are subsequently enclosed to be hidden from view, appropriate venting of the resulting voids / enclosures must be ensured.
- Remaining line openings (pipe ends and outlets) must be properly closed off; a closed isolation valve alone does not suffice.



Operator responsibilities (2)

- If rooms are used for purposes other than those for which they were originally designated, an authorised installation company or the grid operator will have to examine any impact on existing lines.
- The exact location of lines hidden from view must be known.
- Gas hose lines must be used such that there is no tension on, or kinking or twisting of, the line. Like the valve on the appliance the gas hose lines must not be subjected to excessive temperatures.
- Isolation devices must be fully operational and accessible at all times.



Operator responsibilities (3)

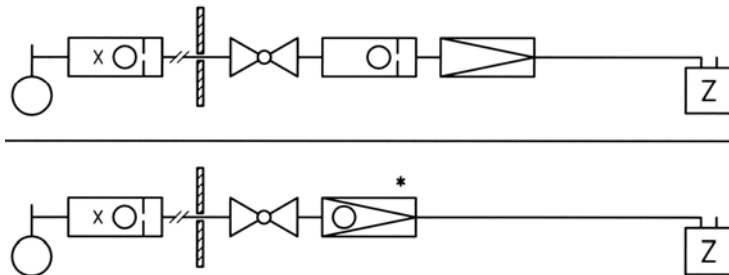
Inspections and inspection intervals

- The operator must visually inspect the piping or have the piping visually inspected once every year, making sure there is no smell of gas.
- The operator must have the operability and tightness checked by an authorised installation company every 12 years.

Tampering made difficult

Example: Gas flow switch installed in the piping

Single and double family homes



No passive measures required
because room is not generally
accessible

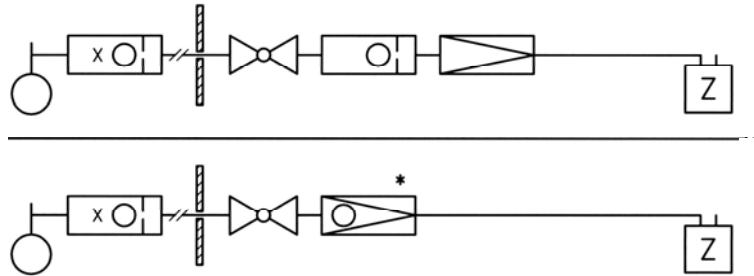
K or M type:
Closing factor: $f < 1.8$

Source: DVGW-TRGI G 600

Tampering made difficult

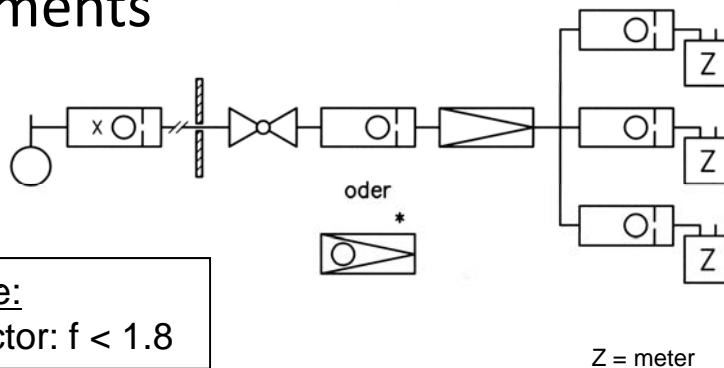
Example: Gas flow switch installed in the piping

Multi-family home with central gas use



- a) no “generally accessible room”
or
- b) permanent connection(s)
or
- c) secured non-permanent connection(s)

Multi-family home with gas appliances installed in the individual apartments



- a) no “generally accessible room”
or
- b) permanent connection(s)
or
- c) secured non-permanent connection(s)

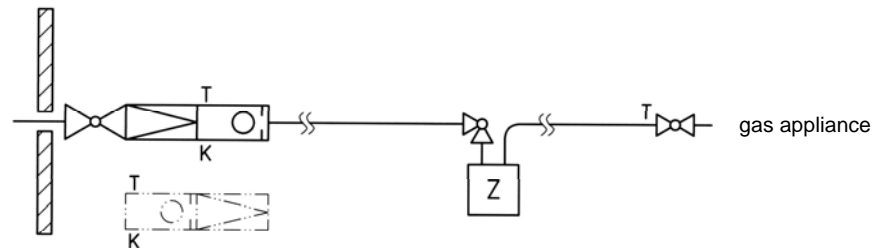
K or M type:
Closing factor: $f < 1.8$

Z = meter

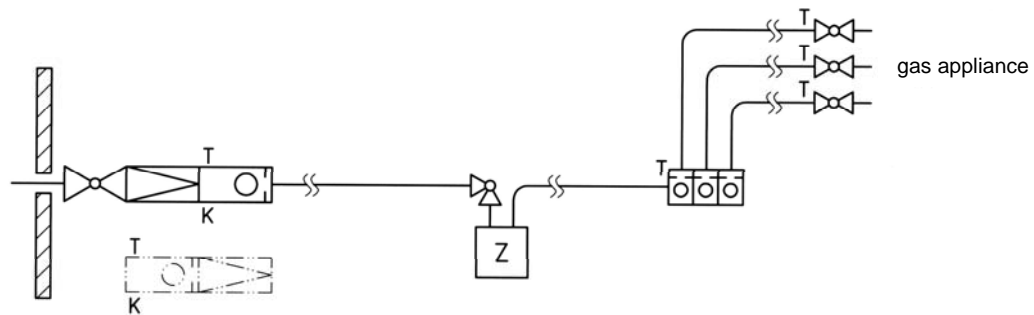
Source: DVGW-TRGI G 600

Gas line routing

Routing of in-house plastic gas lines if connected to a single gas appliance



Routing of in-house plastic gas lines if connected to a distribution manifold



K type:
Closing factor: $f < 1.45$

Z = meter

Source: DVGW-TRGI G 600



In-house gas installations in Germany

Conclusion:

The low accident rate caused by in-house gas installations show the high quality standards in Germany.

There is a comprehensive set of technical codes issued by DVGW covering all areas from design and construction to operation.

Only certified companies are allowed to perform gas installation work in Germany.

Proven compliance with high safety standards