


**Certification programme ZP
“Zertifizierungsprogramm” 5170
of DVGW CERT GmbH, Bonn**

**Supplementary tests for foam producing
solutions for leak detection against a
hydrogen content of up to
100 % by volume**

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		Doc. type	ZP
		Author	DVGW CERT GmbH
		Stand	17.07.2024

0 Preliminary remark

The following certification and test basis describes the requirements, motivation, and tests for qualitatively assessing foam producing solutions for leak detection for use with up to 100 % hydrogen by volume (H₂) with regard to the foam pattern. The evaluation is carried out on a prepared annular gap at which a corresponding leakage occurs at a constant test pressure. The foam pattern is determined for H₂ and N₂, optionally it can be determined for other gases, such as methane. The respective foam patterns will vary depending on the type of gas and leakage rate.

The subject of this certification programme is material testing of foam producing solutions for leak detection that have already been certified in accordance with DIN EN 14291.

The DVGW research project ECLHYPSE G 202138 [1] has determined and quantitatively analysed conversion factors (e.g. for hydrogen in relation to air) as part of a series of measurements with various test leaks. These conversion factors relate to individual gases but can also be used to a certain extent for gas mixtures or the gases of the 2nd and 5th gas family defined in DVGW Worksheet G 260.


The method presented in this ZP provides an additional qualitative characteristic in the form of the foam pattern against H₂, which makes it possible to compare the foam producing solution for leak detection in terms of bubble formation on contact with hydrogen with the bubble formation of nitrogen or methane and possibly other test gases. The ZP thus supports the selection of foam producing solutions for leak detection with regard to their specific behaviour for hydrogen applications. A requirement regarding the optical appearance of the foam pattern is not specified. The foam pattern is analysed at a fixed leak with constant test pressure.

This ZP therefore makes the statement "**H₂ tested**" for the foam producing solutions for leak detection. The evaluation of the foam pattern determined optically within the scope of this ZP is purely qualitative and must be carried out by the user, considering the installation position of the interface to be tested. Information on this is given, for example, in CEN/TR 17924.

Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 1: Anaerobic jointing compounds

Bibliography

- [1] DVGW G 202138 – Experimentelle Charakterisierung der Leckraten von Prüflecks mit H₂ und/oder CH₄-H₂-Gasgemischen gegenüber Luft (DVGW-Innovationsprogramms Wasserstoff (<https://www.dvgw.de/themen/forschung-und-innovation/forschungsprojekte/dvgw-forschungsprojekt-leckgeraten-gasmischungen>))

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1 Certification procedure

Products Gas, national conformity mark (European non-harmonised area).

The possibility of using foam producing solutions for leak detection with natural gas-H₂ mixtures or pure hydrogen is indicated and listed in a directory of H₂ certification programmes of DVGW CERT GmbH.

2 Accreditation

An accreditation No. D-ZE-16028-01 exists for the procedure at German accreditation body („die Deutsche Akkreditierungsstelle GmbH“) (DAkKS), Berlin.

3 Marks

3.1 Certification mark

DVGW resp. DIN-DVGW certification mark Products




Registration number scheme:
 DG-5170DP0001 resp. NG-5170DP0001

DG = DVGW certification mark for gas,
 NG = DIN-DVGW certification mark for gas,
 5170 = product code, DP = 2024, 0001 = serial no.

3.2 Note on use



Note: The H₂ -Ready mark of DVGW CERT GmbH has no direct reference to the tests described in this ZP. It is an indication that the product can be used against natural gas-H₂ mixtures or pure hydrogen.

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4 Type of certificate and test procedure

The certification covers material tests on foam producing solutions for leak detection that have already received DIN-DVGW certification in accordance with DIN EN 14291.

The duration of validity of the confirmation in accordance with this certification programme is linked to the existing DIN-DVGW certificate in accordance with DIN EN 14291.

5 Scope of application

Product group	Product code	Product type
Foam producing solutions for leak detection	5170	Leak detector spray - 0 °C - 50 °C Leak detector spray -15 °C - 50 °C

6 Testing laboratories

Testing laboratories accredited in accordance with EN ISO/IEC 17025 for the relevant test bases and contractually bound to DVGW CERT GmbH.

7 Requirements

7.1 General requirements:

Foam producing solutions for leak detection shall be certified by DVGW CERT GmbH in accordance with DVGW regulations for use with 1st, 2nd, and 3rd gas family in accordance with DVGW worksheet G 260.

The leak detectors tested and certified in accordance with ZP 5170 are listed in a directory issued by DVGW CERT GmbH.

7.2 Requirements for use with up to 100 % hydrogen by volume:

It is determined whether a foam pattern is formed in the case of a fixed leakage and whether and in what way this foam pattern differs depending on the type of gas. A foam producing solution for leak detection serves the user as a tool for the optical detection of leaks in hydrogen applications.


DVGW G 406 (M), Annex B, provides a basic procedure for assessing H₂ suitability according to characteristics and the basis of the assessment.

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7.3 Examinations:

Test conditions	<p>Based on DIN 751-1, "Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 1: Anaerobic jointing compounds"</p> <p>Sample volume (0.1 ± 0.01) ml</p> <p><u>Testing the foam pattern</u></p> <p>Test temperature (23 ± 5) °C Gas pressure (50 ± 2) mbar Medium H₂ (purity at least 99.9 % by volume) Medium N₂ (purity at least 99.9 % by volume) Medium CH₄ (purity at least 99.9 % by volume)</p>
Realisation	<ol style="list-style-type: none"> 1. Pour approx. 20 ml of the foaming solution into a beaker for leak detection and leave to stand until there is no more foam and any propellants have outgassed 2. Set the test pressure of (50 ± 2) mbar at the prepared annular gap and record the resulting leakage. 3. The annular gap is dimensioned so that the flow rate at N₂ is approx. 1.8 ml_r/min. 4. The pressure curve must also be recorded. 5. Remove (0.1 ± 0.01) ml from the beaker and apply evenly and circumferentially along the prepared annular gap using a piston pipette 6. After applying the foam producing solution for leak detection, the foam pattern must be documented by means of photos after 30 s, 60 s and 180 s.
Evaluation	The evaluation is carried out qualitatively by a visual comparison of the foam pattern of the respective test gases.

Note: In addition, the optical evaluation of the foam pattern can also be determined with other gases. Information on their compatibility can be found in the technical data sheets or requested from the respective manufacturers.

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8 Other applicable documents

In the case of undated references, the current edition of the following documents applies:

- DVGW CERT GmbH <40014> Geschäftsordnung der DVGW CERT GmbH zur Zertifizierung von Produkten im nicht harmonisierten Bereich
- DVGW G 260 (A):2021-09
Gasbeschaffenheit
- DVGW G 406 (M):2023-01
Anforderungen an neue Gasarmaturen in H₂-Anwendungen für Gastransport, Gasverteilung und Gasinstallation
- DVGW G 600 (A): 2018
Technische Regel für Gasinstallationen (DVGW-TRGI)
- DIN EN 14291:2004
Schaumbildende Lösungen zur Lecksuche an Gasinstallationen
- DIN EN 751-1:1997
Dichtmittel für metallene Gewindeverbindungen in Kontakt mit Gasen der 1., 2. und 3. Familie und Heißwasser – Teil 1: Anaerobe Dichtmittel
- PD CEN/TR 17924:2023-05¹
Sicherheits- und Regeleinrichtungen für Brenner und Brennstoffgeräte für gasförmige und/oder flüssige Brennstoffe. Leitfaden zu wasserstoffspezifischen Aspekten
- EN ISO/IEC 17025
Allgemeine Anforderungen an die Kompetenz von Prüf- und Kalibrierlaboratorien

The currently valid issue status applies.

9 Period of validity

This certification programme is valid from 17.07.2024.

¹ Note: 2. edition is expected for 10/2024