

	Certification programme ZP 5102 Supplementary tests of rubber materials for seals and diaphragms in gas appliances and equipment in contact with (renewable) dimethyl ether	55102-00-N-GB	
		Doc. type	ZP
		Author	DVGW CERT GmbH
		Status	07.01.2025

Certification programme ZP
“Zertifizierungsprogramm” 5102
of DVGW CERT GmbH, Bonn

Supplementary tests of rubber materials
for seals and diaphragms for gas
appliances and equipment in contact with
(renewable) dimethyl ether

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0 Purpose

The gas definition according to EN 437 does not consider H₂ nor (renewable) Dimethyl ether ((r)DME) within the gas families. Therefore the normative scope of elastomer standards such as EN 549+A2:2024 or DIN EN 682:2006 does not cover H₂ or (r)DME applications.


This ZP specifies additional requirements and associated test methods for rubber materials used in gas installations, gas equipment and gas appliances that are intended to be used in contact with (renewable) dimethyl ether ((r)DME) pure as well as blended with LPG.

The subject of this certification programme is material testing of rubber materials that have already received DIN-DVGW certification in accordance with DIN EN 549 or DIN EN 682.

No statement is therefore made regarding the permeation or tightness of moulded parts, as design aspects play a significant role here.

As rubber materials are used as seals and diaphragms in products and systems, leak testing in the system is still crucial.

The test methods and limit values described in this ZP correspond to the agreed processing status for the update of EN 549 from the European standardisation committee CEN/TC 208.

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1 Certification procedure

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

The possible use of rubber materials with (r)DME liquefied petroleum gas (LPG) mixtures or pure (r)DME is documented and listed in a directory of DVGW CERT GmbH certification programmes.

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 or DIN-DVGW certification mark Products



Registration number scheme:

DG-5102DP0001 resp. NG-5102DP0001

DG = DVGW certification mark for gas,


NG = DIN-DVGW certification mark for gas,

5102 = product code, DP = 2024, 0001 = serial no.

3.2 Note on use



Note: The (r)DME mark of DVGW CERT GmbH has no direct reference to the tests described in this ZP. It is an indication that the material can be used with (r)DME-LPG mixtures or pure (r)DME.

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4 Type of certificate and test procedure

The certification covers material tests on rubber materials that have already received DIN-DVGW certification in accordance with DIN EN 549 or DIN EN 682


The duration of the confirmation according to this certification programme is linked to the existing DIN-DVGW certificate according to DIN EN 549 or DIN EN 682.

5 Scope

Product group	Product code	Product type
Elastomer materials for seals and diaphragms	5101	Elastomer material for seals in gas appliances and equipment with life assessment
	5102	Elastomer material for diaphragm and seals in gas appliances and equipment with life assessment
	5104	Elastomer material for seals in gas supply mains and pipelines with life assessment
	5105	Materials for diaphragm in gas appliances and equipment, not reinforced, with life assessment
	5112	Elastomer material for seals in gas appliances
	5113	Elastomer material for seals in gas supply mains and pipelines
	5131	Materials for membranes for gas appliances and equipment, not reinforced
	5132	Materials for membranes for gas appliances and equipment, reinforced
	5133	Materials for membranes for gas equipment
	5139	Elastomer material for diaphragm and seals for gas appliances and equipment

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.

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7 Requirements

7.1 General requirements

The rubber materials must be certified by DVGW CERT GmbH in accordance with DVGW set of rules for use with natural gas.

The materials tested and certified in accordance with ZP 5102 are listed in a DVGW CERT GmbH directory.

7.2 Classification

When used in contact with (r)DME, blended or pure the letter D (for pure) or DBxx (DME-blended) for blended is added to the classification. Where "xx" is the maximum percentage DME allowed.

Note: The focus is on DME blends of 20 % (envisaged for the 3rd gas family) or 100 % (as a separate gas family). If necessary, further intermediate stages should be implemented, preferably in 20 % steps.

EXAMPLE: The classification of a rubber material applicable over the temperature range from – 20 °C to + 80 °C with a declared nominal hardness of 70 IRHD-M which is allowed for use with a DME content of up to 20 % would be B2/H3/DB20.

7.3 Additional requirements


7.3.1 Requirements for testing with liquid substitute reagent

When tested in accordance with the methods detailed in section 7.4.1, circular test pieces with a diameter between 30 mm and 40 mm and a thickness of (2 ± 0.2) mm shall be used. The material shall comply with the requirements given in Table 7-1.

Table 7-1: Additional requirements for use in contact with (r)DME

Property	Unit	Requirement
— Change in volume after immersion	%	≤ 50
— Change in mass after drying ^a	%	+5 –8
^a It is recommended to determine the change in volume as well, to get a understanding what is really happening with the material.		

In case the change in volume is larger than 50 %, the test in 7.3.2 can be used for further examination whether the material still can be accepted or not.

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7.3.2 Requirements for testing with liquefied gas (optional)

When tested in accordance with the methods detailed in clause 7.4.2 circular test pieces having a diameter between 30 mm and 40 mm and a thickness of (2 ± 0.2) mm shall be used. The material shall comply with the requirements given in table 7-2.

Table 7-2: Additional requirements for use in contact with (r)DME

Property	Unit	Requirement
— Change in volume after immersion	%	≤ 35
— Change in mass after drying ^a	%	+5 -8

^a It is recommended to determine the change in volume as well, to get a better understanding what is really happening with the material.

7.4 Test method

7.4.1 Testing with liquid substitute reagent


Three test pieces shall be tested in accordance with ISO 1817, using the following conditions:

- immerse for 72_{-2}^0 h at (23 ± 2) °C in n-butyl-acetate and pentane having a composition as given in Table 7-3.
- after removal from the liquid, wipe dry rapidly and weigh immediately in air and water;
- determine the change in volume with reference to the initial volume of the specimen;
- dry the test specimen for a period of 96_{-2}^0 h in a normal air oven at (70 ± 2) °C;
- determine the change in mass with reference to the initial mass of the specimen.

Calculate the arithmetic mean values of the three results both after immersion and after drying.

Table 7-3: Composition of the test liquid

Intended use, [% (r)DME in LPG]	Test liquid [% n-butyl acetate in pentane]
≤ 0	The ZP is not meant for this application, see main text of DIN EN 549 for this
≤ 20	20
≤ 40	40
≤ 60	60
≤ 80	80
≤ 100	100 (so only n-butyl-acetate)

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7.4.2 Testing with liquefied gas

Three test pieces shall be tested in accordance with ISO 1817, using the following conditions:

- immerse for 72₋₂⁰ h at (23 ± 2) °C in blend of (r)DME and propane under pressure, such that it is assured the test pieces are in liquid. The gas mixture should have a composition as given in Table 7-4.
- after removal from the liquid, directly determine the change in volume using the photographic method.


NOTE: Photographic method required to deal with the fast changes because of evaporation of gasses.

- determine the change in volume with reference to the initial volume of the specimen.
- dry the test specimen for a period of 96₋₂⁰ h in a normal air oven at (40 ± 2) °C;
- determine the change in mass with reference to the initial mass of the specimen.

Calculate the arithmetic mean values of the three results both after immersion and after drying.

Table 7-4: Composition of the test gas

Intended use, [% (r)DME in LPG]	Test gas [% (r)DME in propane]
≤ 0	The ZP is not meant for this application, see main text of DIN EN 549 for this
≤ 20	20
≤ 40	40
≤ 60	60
≤ 80	80
≤ 100	100 (so only (r)DME)

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8 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
- DIN EN 437:2021-07
Prüfgase - Prüfdrücke - Gerätekategorien
- DIN EN 549:2024-07
Elastomer-Werkstoffe für Dichtungen und Membranen in Gasgeräten und Gasanlagen
- DIN EN 682:2006-10
- EN ISO/IEC 17025
Allgemeine Anforderungen an die Kompetenz von Prüf- und Kalibrierlaboratorien
- ISO 1817:2024-03
Elastomere oder thermoplastische Elastomere - Bestimmung des Verhaltens gegenüber Flüssigkeiten

The current issue status applies.

9 Period of validity

This certification programme is valid from 07.01.2025.