



Technical Rule - Code of Practice

DVGW G 402 (A) July 2011



Grid and damage statistics - Collection and evaluation of data for devising maintenance strategies for gas distribution systems

Warning

This English-language version is an informal translation from the German original. However, only the original German language version has been exclusively authorised by the DVGW and its Technical Bodies. The DVGW reserves the right to revise this version at any time due to possible translation errors.

Anybody is free to use the DVGW system of rules. Users are responsible for the proper use of the DVGW system of rules in each individual case.

The DVGW German Technical and Scientific Association for Gas and Water e.V.; Technical-Scientific Association – has been supporting the gas and water sectors since 1859 with a focus on safety, hygiene and the protection of the environment.

Setting the technical rules, the DVGW encourages ongoing progress in this sector. The DVGW and its approximately 12,000 members work out the overall recognised technical rules applicable to gas and water engineering; they audit and certify (via DVGW CERT GmbH) products, persons and companies, initiate and support research projects and offer training courses covering the entire range of relevant gas and water topics.

The DVGW Technical Rules constitute the basis of the technical self-management and self-responsibility of the German gas and water industry and guarantee the safe and secure supply of gas and water at the highest international level.

The DVGW is an independent non-profit organisation free from economic lobbyism and political influence.

ISSN 0176-3490 Pricegroup: 8

DVGW German Technical and Scientific Association for Gas and Water e.V.; Technical-Scientific Association

Josef-Wirmer-Str.1-3 D-53123 Bonn / Germany

Phone: +49 228 9188-5 Fax: +49 228 9188-990 Email: info@dvgw.de Internet: www.dvgw.de

Reprint and photomechanical reproduction, also of excerpts, is only permitted with the approval of the DVGW e.V., Bonn.

Distribution: Wirtschafts- und Verlagsgesellschaft Gas und Wasser mbH, Josef-Wirmer-Str. 3, 53123 Bonn

Phone: +49 228 9191-40 · Fax: +49 228 9191-499 Email: info@wvgw.de · Internet: www.wvgw.de



Grid and damage statistics - Collection and evaluation of data for devising maintenance strategies for gas distribution systems

Content

Foreword5		
1	Scope	7
2	Normative references	7
3	Definition of terms	7
3.1	As-built data	8
3.2	Replacement	8
3.3	Operability	8
3.4	Gas distribution system	8
3.5	Inspection	8
3.6	Maintenance	8
3.7	Overhauling	8
3.8	Gas line section	8
3.9	Line object	8
3.10	In-service behaviour	8
3.11	Dot object	8
3.12	Rehabilitation	9
3.13	Repair	9
3.14	Reconstruction	9
3.15	Damage	9
3.16	Type of damage	9
3.17	Damage data	9
3.18	Damage rate	9
3.19	Cause of damage	9
3.20	Weakness	9
3.21	Service	9
3.22	Ambient data	9
3.23	Condition data	10
4	Gas distribution system maintenance – Fundamentals	10
4.1	General	10
4.2	Maintenance strategies	10
4.3	Maintenance activities	10

5	Maintenance relevant data	11
5.1	General	11
5.2	As-built data	12
5.3	Damage data	14
5.4	Other condition data	15
5.5	Ambient data	15
6	Data collection	16
6.1	General	16
6.2	Documentation requirements	16
7	Data preparation and evaluation	16
7.1	General	16
7.2	Data preparation	17
7.2.1	As-built data preparation	17
7.2.2	Damage and condition data preparation	19
7.2.3	Ambient data preparation	20
7.3	Data evaluation	21
8	Development and control of maintenance strategies	21
8.1	General	21
8.2	Development of maintenance strategies	22
8.3	Control of the efficacy of a maintenance strategy	23
9	Maintenance planning – Data processing systems	23
Annex	A (informative) – Data collection examples	24
Annex	B (informative) – Pipe-laying times for different pipeline materials and connection	n types .26
Annex	C (informative) – Potential criteria for defining groups	27
Annex	D (informative) – Condition data produced from cathodic protection system	29
Annex	E (informative) – Cathodic Protection (CP) based maintenance schedule	30
Annex	F (normative) – Special grey cast iron programme	31
Annex	G (informative) – Preparation of damage and condition data	32
Annex	H (informative) – Development of a maintenance strategy - Fundamentals	36
Annex	I (informative) – Forms for collecting damage, as-built and condition data (examp	oles)37

Foreword

This Code of Practice has been elaborated by the "G 401" project group within the Technical Committee on "Gas distribution". It shall serve as a basis for the collection and evaluation of data to devise maintenance strategies for gas distribution systems.

Maintenance comprises inspection as well as service and repair activities. The respective DVGW Codes of Practice define the fundamental principles applying to inspection and service activities. This Code of Practice G 402 focuses on the collection and evaluation of data that form the main basis for repair planning.

The requirement for gas distribution systems to be permanently kept in a condition guaranteeing their technical safety and reliability necessitates timely and ongoing maintenance and service activities. These activities shall be planned in advance.

Maintenance strategies shall be integrated into corporate processes, the collection of major grid data being a prerequisite for introducing such strategies. Beyond this, condition-based maintenance requires ascertaining and evaluating grid conditions by means of adequate systems.

This Code of Practice describes the fundamental procedure for ascertaining, collecting and evaluating maintenance-relevant data and offers examples illustrating how to prepare and evaluate them.

This Code of Practice does not specify a standard data collection procedure for creating a planning concept in conformance with the DVGW Technical Rules.

This Code of Practice supersedes DVGW Code of Practice G 401:1999-09.

Amendments

The following amendments have been made vis-à-vis DVGW Code of Practice G 401:1999-09:

- a) reviewed content addressing the fundamentals of devising maintenance strategies
- b) definition of maintenance-relevant data (minimum data volume)
- c) additional information on how to collect, prepare and evaluate data
- d) informative description of maintenance strategies
- e) description of rehabilitation and reconstruction methods deleted

Earlier editions

DVGW G 401:1999-09