

Deutscher Verein des Gas- und Wasserfaches e.V.



www.dvgw-regelwerk.de

# Technical Rule — Standard **DVGW W 115** July 2008

**Drillings for Exploration, Monitoring and Abstraction of Groundwater** 

**WATER** 

The DVGW is the technical and scientific association of gas and water engineers and comprises approximately 14,000 members. For more than 150 years, the DVGW has been setting the technical standards for the safe, secure and reliable supply of gas and water, actively initiating the exchange of ideas and information in the gas and water sectors and encouraging and promoting on-going progress in the sectors through practical guidance.

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

The DVGW Set of Rules is a key instrument for the DVGW to meet its statutable purpose and accomplish its tasks. The DVGW Set of Rules notably defines, on the basis of statutory regulations, the requirements on technical safety, hygiene, environmental protection, fitness for use and consumer protection and organisation for the supply and use of gas and water. The DVGW Set of Rules ensures that the DVGW complies with the statutory principle of self-responsibility of the utilities, for the benefit of technical safety and hygiene as well as environmental and consumer protection.

#### Note for users

The DVGW Set of Rules rests on the following principles:

- The DVGW Set of Rules has been elaborated in an honorary capacity in accordance with the applicable principles (DVGW Constitution, Rules of Procedure GW 100). On the basis of jurisdiction, both the content and the technical information can be assumed to be correct.
- Everybody can use the DVGW Set of Rules. Duties and obligations may arise from legal or administrative regulations or from a contract or from other legal grounds.
- Nobody can abdicate their responsibility for correct action when applying the DVGW Set of Rules. Anyone applying the DVGW Set of Rules shall ensure its correct application in each concrete case.
- While the DVGW Set of Rules is not the only source of knowledge when looking for professional solutions, it does constitute an important source of such knowledge. It cannot however cover all possible special cases that may require more comprehensive or restrictive measures.

#### 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.

ISSN 0176-3504 Price group: 7

© DVGW, Bonn, July 2008

DVGW German Technical and Scientific Association for Gas and Water

Josef-Wirmer-Straße 1-3

D-53123 Bonn

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

Reprinting 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, D-53123 Bonn

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



## Drillings for Exploration, Monitoring and Abstraction of Groundwater

### Contents

| Preamble5 |                                      |      |  |
|-----------|--------------------------------------|------|--|
| 1         | Scope                                | 7    |  |
| 2         | Normative references                 | 7    |  |
| 3         | Definitions                          | 8    |  |
| 3.1       | Direct sampling                      | 8    |  |
| 3.2       | Indirect sampling                    | 8    |  |
| 4         | Water management requirements        | 8    |  |
| 5         | Drilling methods                     | 9    |  |
| 5.1       | General principles                   | 9    |  |
| 5.2       | Classification of drilling methods   | 11   |  |
| 5.2.1     | Basic procedural differences         | 11   |  |
| 5.2.2     | Dry drilling                         | . 11 |  |
| 5.2.3     | Flush drilling operations            | 12   |  |
| 5.2.3.1   | Flush drilling methods               | 12   |  |
| 5.2.3.2   | Direct circulation drilling methods  | 13   |  |
| 5.2.3.3   | Reverse circulation drilling methods | 15   |  |
| 5.3       | Deviation from the borehole axis     | 17   |  |
| 5.3.1     | Principles                           | . 17 |  |
| 5.3.2     | Influence of the substratum          | 17   |  |
| 5.3.3     | Influence of the drilling tools      | 17   |  |
| 5.3.4     | Influence of the drilling method     | 18   |  |
| 5.3.5     | Deviation measurements               | 18   |  |
| 6         | Sample recovery and sample taking    | 18   |  |
| 6.1       | General                              | 18   |  |
| 6.2       | Geological tasks                     | 18   |  |
| 6.3       | Hydrogeological tasks                | 19   |  |
| 6.4       | Constructional tasks                 | 19   |  |
| 6.5       | Requirements on sample quality       | 19   |  |
| 6.6       | Sample recovery                      | 20   |  |
| 6.6.1     | General                              | 20   |  |
| 6.6.2     | Influences on sample quality         | 20   |  |
| 6.6.3     | Direct sampling                      | 21   |  |

| 6.6.4   | Indirect sampling                                      | 21 |
|---------|--|----|
| 6.6.4.1 | General  | 21 |
| 6.6.4.2 | Methods with direct fluid circulation                  | 21 |
| 6.6.4.3 | Methods with reverse fluid circulation                 | 22 |
| 6.7     | Sample taking  | 23 |
| 6.7.1   | General  | 23 |
| 6.7.2   | Influences of sample taking on sample quality          | 23 |
| 6.7.3   | Sample taking with direct sample recovery              | 23 |
| 6.7.4   | Sample taking with indirect sample recovery            | 23 |
| 6.8     | Sample quantity  | 25 |
| 6.9     | Protection of sample material                          | 25 |
| 6.10    | Sample containers and their identification             | 26 |
| 7       | Notification requirements and licenses under water law | 26 |
| 8       | Considerations regarding the contract specifications   | 27 |
| 9       | Contract award   | 27 |
| 10      | Inspections, acceptance of drilling operations         | 27 |
| 11      | Documentation  | 28 |

**Preamble** 

This Code of Practice has been revised by a project group of the DVGW Technical Committee "Water

Abstraction". It serves as basis for the sinking of vertical boreholes and for the professional and appropriate recovery and taking of rock samples during drilling operations for groundwater development

and groundwater abstraction. The information also applies for drilling operations for geothermal

applications.

The selection of a suitable drilling method and the appropriate performance of drilling measures are of

crucial importance for the exploration, abstraction and monitoring of groundwater. Drilling operations

supply the necessary information on the geological and hydrogeological subsoil conditions and, if carried out appropriately, form the basis for the proper development into groundwater monitoring points and

wells as well as their long-term use.

This Code of Practice provides information on the usual drilling methods and their applications. In

addition, it contains references to possible faults during water development work, which may have

consequences for operation, maintenance (regeneration, rehabilitation) and dismantling. As a summarising abstract it shall serve anyone involved with drilling operations as starting point for project-

related considerations.

This technical standard replaces DVGW Technical Standard W 114.

**Amendments** 

a) Complete revision of contents

Incorporation of core sample recovery (formerly DVGW W 114 (M)) b)

**Earlier editions** 

DVGW W 114 (M):1989-06

DVGW W 115 (A):1977-02

DVGW W 115 (A):2001-03

DVGW W 115 Standard 5