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Qualification criteria for designers and manufacturers of gas pressure regulating and gas measuring stations and biogas injection plants

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Inhalt

Foreword

This Code of Practice has been elaborated by the project group on “Qualification requirements on specialised companies” within the Technical Committee on “Plant Engineering”. It serves as a basis for certifying and awarding the DVGW certification mark to specialised companies that design, manufacture and set up turn-key gas pressure regulating and gas measuring stations.

Quality, safety and security have always been given top priority by the gas industry, and this shall continue to be so in the future. Company certification is indispensable for meeting this goal; this 5th edition of this Code of Practice provides the basis for certification.

This Code of Practice describes not only the qualification criteria to be met by the relevant companies but also – and in some more detail - the fields of work in which appointed experts have to demonstrate particular knowledge. The fact that the Energy Industry Act (EnWG) has now broadened the meaning of the term “biogas” to include hydrogen from renewable sources has created new qualification requirements for appointed experts. These requirements shall be amended if, when and as required.

Only companies that meet the requirements set forth in this Code of Practice are eligible for certification.

Group 3, “Design”, has been newly incorporated into this Code of Practice with the objective being to offer companies exclusively dedicated to designing gas plants an opportunity to apply for certification, thus closing a gap that hitherto existed in the DVGW system of rules.

Moreover, the more concrete hazardous area requirements (explosion protection requirements) were also taken into account.

All general certification-relevant requirements and the code of practice that governs the certification procedure can be found in e. g. the “Rules of procedure governing the certification of specialised companies” of the DVGW CERT GmbH; these standards shall be met as a minimum requirement.

The certificate proves to the customer that the company concerned is qualified to execute the work.

Notwithstanding the above the technically flawless design, manufacture and setting up of gas plants continues to be a prerequisite for the safe and secure supply of gas. This requirement can be met if the work is executed by companies that have been certified for manufacturing gas plants in accordance with this DVGW Code of Practise. Any exceptions to this rule are described in the section titled “Scope”.

This Code of Practice and/or the certification procedure based on it may be used for pre-qualification purposes within the scope of the “DIRECTIVE 2004/17/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL” of 31 March 2004 that coordinates the procurement procedures of entities operating in the water, energy, transport and postal services sectors.

PLEASE NOTE: In all cases where the male gender is used in this Code of Practice in references to occupational titles and functions it is intended that this shall be deemed to include or be read as female gender and vice versa. The male gender is used solely for editorial reasons.

This Code of Practice supersedes DVGW Code of Practice G 493-1:2007-02.

Amendments

The following amendments have been made vis-à-vis DVGW Code of Practice G 493-1:2007-02:

a) Text Changed title – Adoption of the term “design” as a term in its own right and inclusion of biogas injection plants

b) The scope of application has been broadened to include companies that design and manufacture biogas injection plants. This also includes compressor stations that feed gas back into upstream grids that will in future be covered by the scope of DVGW Code of Practice G 265-1.

c) The scope of application now includes a note on the future application of the requirements - which are set forth in this Code of Practice - regarding the design and manufacture of plants for measuring, regulating and injecting biogas, including hydrogen, in accordance with the EnWG.

d) The note on certification performed by the DVGW certification body has been deleted from the scope of application.

e) The term “manufacture” has been defined to describe the production and turn-key installation of plants and is now used throughout the entire Code of Practice.

f) Clause 4 now includes the requirement that the design work shall be performed by a company that meets the qualification requirements in accordance with this DVGW Code of Practice. The inclusion of group 3, “Design”, in clause 4 introduces the option of separately certifying companies exclusively dedicated to designing gas plants and systems.

g) The requirement that the experts named in the certificate shall have a permanent position within their company has been extended to alternatively permit permanent employment with the pertinent group of companies. An expert’s availability for performing the work for which he is responsible continues to be of crucial importance.

h) The concrete requirement to demonstrate on an annual basis that employees have attended the scheduled training courses has been deleted. Instead, such proof shall be furnished on an up-to-date basis, depending on what is stated in the training schedule.

i) Certification may upon a company’s request be limited to apply to a maximum design pressure of DP 5 or DP 16 of the manufactured gas plant.

j) Job titles have been adapted to conform to the new titles of technical university and college graduates.

k) Design experts shall now have profound knowledge about explosion protection.

l) As regards documentation requirements, reference is made to DVGW Information Gas No. 15.

Earlier editions:

DVGW G 493-1:2007-02

DVGW G 493-1:1998-05

DVGW G 493:1986-07

DVGW G 493:1982-02

1 Scope

This Code of Practice describes the staff and functional requirements to be met by companies that design and/or manufacture and set up turn-key

- Gas pressure regulating and measuring stations in accordance with DVGW Codes of Practice G 491 and G 492 and/or

- Biogas injection plants in accordance with DVGW Test Specification VP 265-1[1], including plants that feed back gas into upstream grids (hereinafter called gas plants).

The qualification requirements for companies that design and/or manufacture and set up turn-key biogas injection plants include the pertinent gas pressure regulating and measuring station requirements.

In the future, the stipulations in this Code of Practice can also be applied to the design and the manufacture of biogas measuring, regulating and injection plants in accordance with the *EnWG*. This requires furnishing proof that the appointed experts have the knowledge specified in the qualification requirements.

Design and manufacture of gas plants may also be performed by companies, which, within the scope of a comprehensive operational management, are originally or as service provider responsible for the construction, operation and maintenance or only for the construction and maintenance of energy systems, and which have proven the personal qualification and organisation required in this regard within the scope of the TSM inspection according to DVGW Code of Practice G 1000, within the network area named in the TSM certificate. Prerequisite for this is that all staff and technical requirements stipulated in this Code of Practice are met. The responsible experts shall be appointed in-house in writing.

Meeting the qualification criteria mentioned below is an indispensible prerequisite for companies that wish to be certified for designing and manufacturing gas plants.

2 Normative references

The documents cited below are required for the application of this document. For dated references, only the edition referred to applies. However, parties to agreements based on this DVGW system of rules are encouraged to apply the most recent editions of the normative documents indicated below. For undated references the latest edition of the document referred to applies (including all amendments). Listed DIN standards may be part of the DVGW system of rules.

2.1 DVGW system of rules

DVGW G 213 (A), *Plants for the production of combustible gas mixtures*

DVGW VP 265-1 (P), *Stations for treatment and feed-in of biogas into gas supply networks – Part 1: Gases produced by fermentation – design, manufacture, installation, testing and commissioning*

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1 We envisage transposing DVGW test specification VP 265-1 into a DVGW Code of Practice when it has proved its worth in the field. This shall not affect the validity of the certificate.

DVGW G 491 (A), *Gas pressure regulating stations for inlet pressures up to and including 100bar – design, manufacture, construction, testing, commissioning and operation*

DVGW G 492 (A), *Gas measuring stations with an operating pressure up to and including 100bar – design, manufacture, construction, testing, commissioning, operation and maintenance*

DVGW G 1000 (A), *Requirements on the qualification and organisation of enterprises operating installations for the pipeline-bound supply of the general public with gas (gas supply installations)*

DVGW GW 350 (A), *Welding joints of steel pipelines for gas and water supply – manufacturing, testing and evaluation*

DVGW Information Gas No. 15, *Guideline for compiling the documentation of gas pressure regulating and measuring stations*

2.2 Standards

DIN EN 10204, *Metallic products – Types of inspection documents*

DIN EN ISO 9000 et seq., *Quality management systems*

3 Terms, symbols, units and abbreviations

3.1 Manufacture

Manufacture comprises the production and turn-key installation of gas plants.

4 Business classification

Classification into the groups listed below has been made to distinguish between the different requirements to be met by a company:

- Group 1: Design and manufacture
- Group 2: Manufacture
- Group 3: Design

If manufacture is carried out by a company belonging to Group 2, the design work shall be performed by a company that meets the requirements applicable to Group 1 or 3.

Certification may upon a company's request be limited to apply to a maximum design pressure of DP 5 or DP 16.

Companies dedicated to designing and manufacturing biogas injection plants in accordance with DVGW VP 265-1 (P) shall observe the additional qualification requirements that apply to the responsible experts.

The certificate shows the scope of certification.

5 General requirements

Companies shall commit themselves in writing to

- Observe and apply the applicable provisions under public law, the accident prevention regulations and the technical rules, with a particular focus on technical safety requirements;
- Prepare complete and meaningful installation documentation on each and every plant set up in accordance with Section 9; this, however, shall not apply to companies belonging to Group 3;
- Ensure that all experts named in the certificate who are permanently employed with the company or the group of companies are available at any time to perform the work they are responsible for;
- Keep the necessary technical system of rules up to date and permanently accessible to the appointed experts and their team;
- Prepare a training schedule covering one or several years to ensure technical in-service training for the appointed experts and their teams, and to furnish proof that training courses have indeed been held;
- Deploy a sufficient number of adequately qualified staff to perform the work required;
- Use suitable equipment, tools, means of communication and materials in sufficient quantities and of adequate quality;
- Protect the environment when carrying out the work;
- Observe the rules of economic efficiency throughout their work to ensure a customer relationship based on partnership.

All appointed experts shall furnish proof that they have profound knowledge of the pertinent regulations and technical rules. The appointed experts shall be firmly embedded into the processes they are responsible for and shall have adequate decision-making competencies.

In case several experts have been appointed responsible for a field of work, their responsibilities shall be defined on a project-related basis.

In case the experts appointed as per 7.1 and 7.2 are indisposed to perform their work, a system of in-house absence management shall be installed.

Experts appointed responsible for the design, manufacture and installation as well as welding supervisors may hold executive positions only if they can demonstrate that they have sufficient time to manage their designated field of work. The appointed factory-authorised inspector shall never hold an executive position.

The company shall ensure that the experts responsible for manufacture, the welding supervisors and the factory-authorised inspectors are available at the place of work and/or manufacture.

6 Formal requirements

6.1 In-house quality management

When submitting their application the company shall demonstrate in writing that it has installed an in-house quality management system. Such proof may be furnished by presenting a certificate in accordance with DIN EN ISO 9000 et seq. The company shall prove that it complies with the minimum requirements listed in Table 1.

Table 1 – Assignment of minimum requirements

Group	1	2	3
Competence and responsibilities of appointed experts	X	X	X
Qualification of team members	X	X	X
In-service training measures	X	X	X
Measures to check the qualification of external experts and subcontractors	X	X	X
Quality assurance measures in the procurement of material, components and assemblies	X	X	
Measures regarding the welding quality requirements as per DVGW Code of Practice GW 350	X	X	
Measures designed to ensure the traceability of design work	X		X
Change procedure for necessary design changes	X	X	X
Measures designed to ensure the traceability of construction work	X	X	X*
Procedures for the approval and handing-over of gas plants, including the pertinent tests	X	X	X
Body and measures designed to update the body of relevant legal provisions, technical rules and technical literature	X	X	X

* for building supervision in accordance with HOAI (invoice for professional services provided by architects and engineers)

All experts shall put both a test and an approval mark on the documents created for their field of responsibility. This applies in particular to plans, parts lists and test documents. Any changes to specifications and documents shall be traceable throughout the entire duration of the project.

6.2 Third-party insurance

When applying for certification, companies shall submit proof of third-party insurance to an amount sufficient to cover damage occurring in the course of business activities.

6.3 Performance record and references

The company and/or the appointed experts shall submit documentation including references on any work carried out hitherto to prove that they have adequate field experience in the field of work for which they wish to be certified.

The requirement to have adequate field experience within the meaning of the above paragraph shall be deemed met if proof is furnished that an annual average of three representative plants to be certified have been designed (only Groups 1 and 3) or manufactured (only Groups 1 and 2). This requirement

may be met also if a smaller number of more complex plants such as e. g. biogas injection plants or delivery points have been designed over a longer period of time.

7 Human resource requirements

As a minimum requirement, companies shall appoint in writing the expert staff listed below for the respective fields of work.

Table 2 – Required in-house experts

Requirements as per section	Group 1	Group 2	Group 3
Design expert	7.1	–	7.1
Manufacturing expert	7.2.1	7.2.1	–
Set-up expert	7.2.1	7.2.1	–
Welding supervisor	> DP 16: 7.2.2.1 ≤ DP 16: 7.2.2.2	> DP 16: 7.2.2.1 ≤ DP 16: 7.2.2.2	–
Factory-authorised inspector	7.2.3	7.2.3	–
Competent person	7.3	7.3	–

7.1 Responsible design expert qualification requirements

The responsible design expert shall furnish proof of having obtained from a technical university and/or university or technical college a relevant technical degree, and of having at least three years of practical experience as an executive or managing expert in designing or manufacturing gas plants.

Such expert shall possess and demonstrate particular knowledge in the following fields of work:

- Approval procedures
- Gas properties
- Material technology, calculation/computation, designing
- Design and construction interactions
- Fundamentals of material and welding technology
- Process engineering processes
- Components and assemblies
- Measurement and control technology
- Gas plant adjustment (pressure staggering)

- Electrical engineering
- Explosion protection
- Construction requirements
- Client consultation on technical and economic matters
- Interactions with upstream and downstream pipeline systems and gas plants
- Gas plant testing

The responsible design expert working in a company that designs and manufactures biogas injection plants shall furthermore possess and demonstrate particular knowledge of

- Distinctive features of approval procedures
- Raw biogas composition
- Interactions between biogas generation, upgrading and injection plants
- Plants for the production of combustible gas mixtures in accordance with DVGW Code of Practice G 213 (conditioning plants)
- Compressor stations
- Gas drying
- Selecting measurement and control protection devices

7.2 Responsible manufacturing expert qualification requirements

7.2.1 Manufacturing and turn-key installation experts

Manufacturing and turn-key installation experts shall furnish proof of qualification as master/foreman or of a technically comparable qualification in a relevant field of metal technology and shall have at least three years of field experience in gas plant construction.

Such experts shall possess and demonstrate particulate knowledge in the following fields of work:

Manufacture:

- Material flows in the plant
- Fundamentals in material and welding technology
- Appropriate and professional assembly of gas plants
- Manufacture and layout of functional lines
- Type and scope of tests to be performed

- Relationships between and sequence of tests
- Gas plant process engineering

Turn-key installation:

- Fundamentals of material and welding technology
- Appropriate and professional assembly of gas plants
- Manufacture and layout of functional lines
- Construction requirements
- Manufacture of connecting lines
- Type and scope of tests to be performed
- Gas plant adjustment (pressure staggering)
- Gas plant commissioning
- Gas plant process engineering
- Interactions between upstream and downstream pipeline systems and gas plants

Responsible manufacturing and turn-key installation experts working in companies that design and manufacture turn-key biogas injections plants shall furthermore possess and demonstrate particular knowledge.

Manufacture:

- Compressor station installation
- Manufacture of pipelines and assemblies for liquid petroleum gas
- Gas mixing systems
- Gas drying
- Characteristic features of stainless steel pipelines

Turn-key installation:

- Raw biogas composition; attendant substances
- Adjustment, protection and commissioning of plants for the production of combustible gas mixtures
- Commissioning of compressor stations
- Interactions between biogas generation, upgrading and injection plants

One responsible expert may manage both manufacturing and turn-key installation.

7.2.2 Welding supervisors

7.2.2.1 Welding supervisors for gas plants with design pressures up to and including DP 100

The responsible welding supervisor shall have a minimum of three years of professional experience as a welding engineer.

If the responsible welding ebgineer is unable to do all the work personally on site, at least one additional welding specialist shall be available to supervise the welding work.

The welding engineer may also double as design expert if he meets the requirements as per 7.1.

The welding engineer shall possess and demonstrate particular knowledge in the following fields of work:

- Explanation of welder selection
- Specification of the welding technique
- Specification of weld seam tests
- Documentation of tests performed
- Gas plant process engineering

7.2.2.2 Welding supervisors for gas plants with design pressures up to and including DP 16

Up to this design pressure and using materials with a minimum yield strength of < 360N/mm² a welding specialist may be employed as welding supervisor if approved welding procedure specifications and qualifications are available. Other welding specifications, in particular the type and quality of non-destructive weld seam testing and evaluation standards shall be specified and subject to spot checks by other competent experts.

The welding specialist shall have at least three years of professional field experience and demonstrate sufficient knowledge of gas plant process engineering.

He shall be responsible for selecting the welders as well as for selecting and determining the scope of the weld seams to be tested and for creating the technical welding documentation.

7.2.3 Factory-authorised inspectors

A skilled person appointed as factory-authorised inspector shall furnish proof of qualification as master/foreman or of a comparable skilled qualification in a relevant field of metal technology and shall have at least three years of professional field experience.

He shall demonstrate that he perform this work independently and is not bound by instructions. Managing several fields of work as per 7.1, 7.2.1 or 7.2.2 is not permitted.

Factory-authorised inspectors shall possess and demonstrate particular knowledge in the following fields of work:

- Materials
- Components and assemblies
- Material flow in the plant
- Technique for remarking pipes
- Strength and leak acceptance tests
- Gas plant process engineering
- Issuing of test certificates in accordance with DIN EN 10204
- Creation and content of the overall gas plant documentation

Factory-authorised inspectors working in companies that design and manufacture biogas injections plants shall furthermore possess and demonstrate particular knowledge of

- Conformity evaluations in accordance with the EU Machinery Directive (incl. CE marking)

7.3 Other specialised staff

At least one competent person as per DVGW Codes of Practice G 491 and G 492 shall be appointed for companies belonging to Group 1 and 2.

At least one competent person as per DVGW test specification VP 265-1 shall be appointed for companies that design and manufacture biogas injections plants (Groups 1 and 2).

8 Technical equipment requirements

8.1 Technical design equipment

The company shall provide all suitable facilities required for creating documentation on the design and manufacture of gas plants.

8.2 Technical production equipment

The company shall provide all suitable workplaces, rooms and facilities for workshop and storage as well as all necessary tools and equipment. Such facilities, tools and equipment shall ensure that gas plants can be professionally manufactured and tested.

9 Documentation

The documentation shall compile all necessary documents in a clear and easily traceable form. This includes e. g. flow sheets, structural drawings, assembly drawings, parts lists, pipework drawings, pipework log, weld seam charts and test certificates. The contents and structure of the gas pressure regulating and measuring station documentation shall conform to the recommendations listed in DVGW Infor-

mation Gas No. 15. For orientation purposes, DVGW Information Gas No. 15 should also be consulted with regard to the documentation of biogas upgrading and injection plants.

The factory-authorised inspector shall be responsible for checking that the documentation is complete (quality and quantity).

Documentation of welding staff, weld tests and test results shall show a clear allocation to the individual components.

The results of all tests that have been carried out shall be responsibly signed by the appointed experts, with their names clearly legible.

Bibliography

Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004, '*Coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors' [EC Utilities Directive]*