

AGFW - codes of practice

IDEA Seattle, June, 10th 2014



Wolf-Dietrich Kunze

Member of the Board of Directors
AGFW e. V., Frankfurt am Main

**The business insurance for
German/European DH -
companies**

- **AGFW** is the independent and impartial association in Germany promoting energy efficiency, (district) heating, cooling and CHP at national and international levels
- **AGFW** reunites round about 500 (regional und municipal) district energy suppliers, consultants and industrial operators of this industry (component and system manufacturers, manufacturing and assembling companies, testing institutes, ...) in Germany and Europe
- **AGFW** represents over 95 % of the heat load connected to German district heating systems – the largest scale in Western Europe.
- **AGFW** means over 40 years of experience in this field. Established 1971 we have a long and distinguished track record of delivering energy efficiency solutions to our members and to the society

DISTRICT HEATING IN GERMANY

CODES OF PRACTICE

CODES OF PRACTICE

- » Responsibilities and Key Aspects
- » Codes of Practice – Framework, Idea, Structure, Minimum Requirements
- » Status of Technical Guidelines/Codes of Practice for District Heating
- » What does „compilation of the Technical Guidelines“ imply?

- **Our Target:**
 - Technical self-administration of the sector as the foundation of lobbying activities.
- **Our Interest:**
 - Politically driven regulation and standardization is open to diverging interests from different groups, which is detrimental to finding objective, technically sound and purpose-driven solutions. Processes get longer, bigger and harder to administrate, consuming sparse resources.
 - The sector should therefore retain its technical self-administration, experts should be involved in the technical work, free from external influence as much as possible.

Framework – Process Chain District Heating



from the sector - for the sector

practical
experiences

planning
building
operation

user controlled

theoretical
knowledge

research and
development

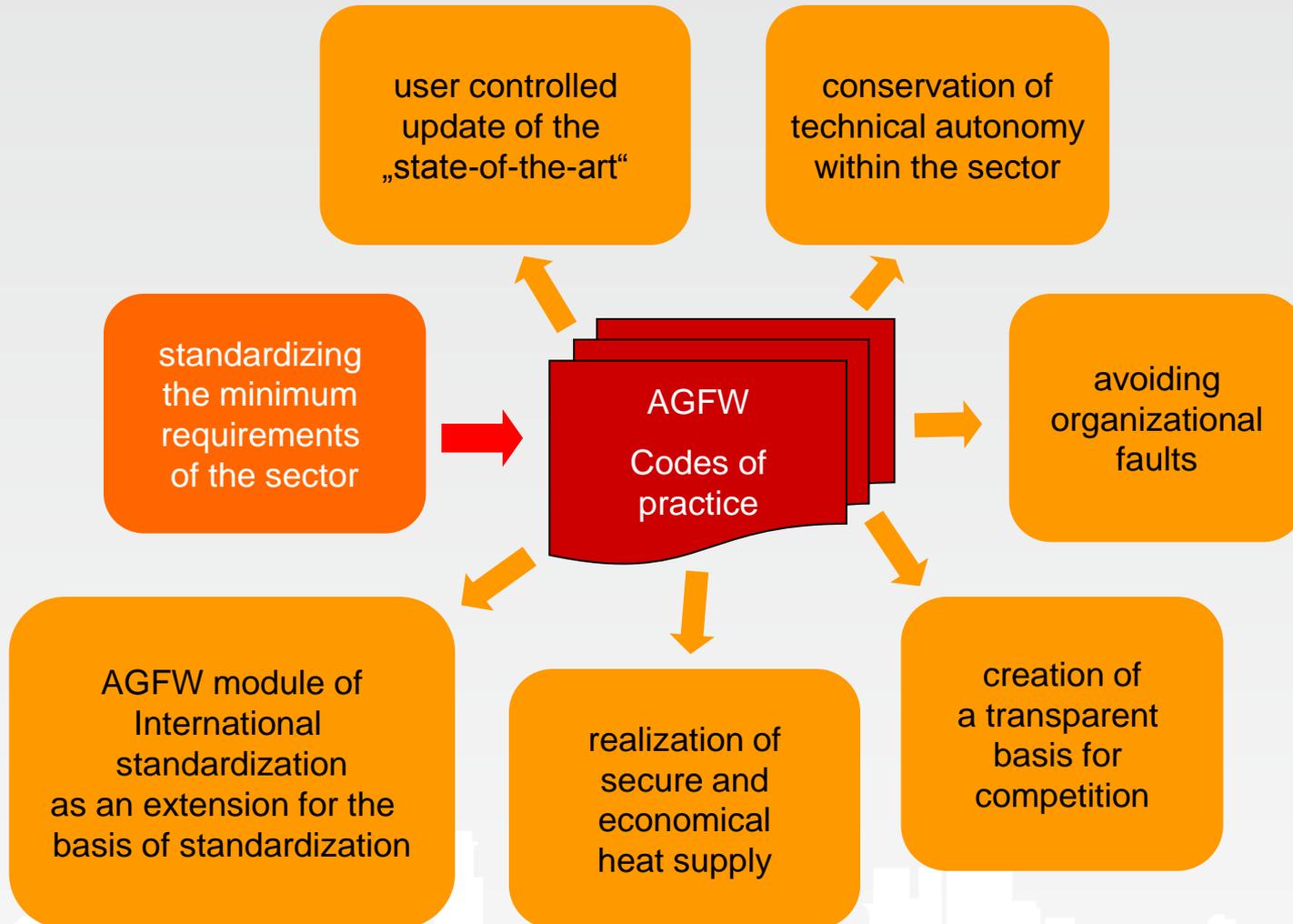
know-how of the sector

know-how of the sector

concept / planning
manufacturing
processing / assembling
quality management
requirements
regarding the qualification of
personnel / machine / company

minimum requirements of the sector

AGFW Codes of practice for CHP, District Heating&Cooling



district heating in general

heat metering and billing

heat generation

heat distribution

customer installations

qualification requirements

operational safety and security

products or services:

- » plastic jacket pipes (FW 401)
- » polymer medium pipes (FW 420)
- » spot drilling (FW 432)
- » pipe freezing (FW 434)
- » welding (FW 446)
- » pressure tests (FW 602)

companies:

- » supply (FW 1000)
- » pipeline construction (FW 601)
- » examination of sleeve fitters (FW 604)
- » sleeve mounting (FW 605)
- » system manufacturer (FW 606)

basis for the creation of organizational safety

personnel:

- » pipeline construction (FW 601)
- » pipe collar fitters (FW 603)
- » coordinated qualification:
 - » service technicians (FW 607)
 - » master craftsmen
 - » engineers

engineering

organisation

personnel

companies of the
public utilities sector and the industry

Example



AGFW Worksheet FW 401 – Part 2

Design and installation of preinsulated bonded pipes for district heating networks - System description -

December 2007

Replaces the version issued in February 1999
Earlier versions: Plastic bonded pipes for district heating networks, 1993
Shallow installation of plastic bonded pipes for district heating networks, 1994

AGFW | Der Energieeffizienzverband für Wärme, Kälte und KWK e. V.

AGFW

Preliminary remarks
Following the revision of the European standards EN 253:2008, 448:2003, 488:2003 and 489:2003 and the publication of the new standards EN 15941:2003 and EN 14419:2004, the entire series of worksheets has been updated.

Since the changes to this particular worksheet – other than the inclusion of the revised standards – are not of a fundamental nature, no draft will be published and the updated version will be published directly as a revised and valid worksheet.

The following modifications have been made to the content of this worksheet since the 1999 version:

Section	Modification
1	Preliminary remarks (new)
2	Notes on twin pipe systems
3.2.3	Minimum cover away from roads increased to 0.6 m
3.2.9	Notes on combination with flexible pipe systems

Contents

	Page
1	Scope 4
2	General information 4
3	Description of the installation method 6
3.1	Description and function 6
3.2	Operating ranges 8
3.2.1	Service pipe temperature 8
3.2.2	Operating pressure 8
3.2.3	Cover depth 8
3.2.4	Nominal service pipe diameters 8
3.2.5	Pipe lengths 9
3.2.6	Insulation thicknesses 9
3.2.7	Soil classes 9
3.2.8	Groundwater 9
3.2.9	Combination with flexible pipe systems 9
4	Important information for use 9
5	Standards and technical rules 10

AGFW Rules and Standards: FW_401_2_A_0712 - 3 -



3 Description of the installation method

3.1 Description and function

The bonded pipe system consists of a steel service pipe and a polyethylene (PE) outer casing which are held firmly together by a layer of rigid polyurethane foam insulation. The steel pipes are welded together. The outer casings of the pipes and system components are sealed and held together by casing joints. Figure 1 shows the basic structure of a bonded pipe and a pipe joint.

Heating or cooling of the water causes the pipe to move in the ground. Because they are rigidly connected, the service pipe and the outer casing always move as a single unit. Because the service pipe and outer casing are bonded together, they also jointly absorb external loads, such as those caused by the earth above them or by traffic.

When the pipe is filled, changes in its length are inhibited because any axial movement causes significant friction between the outer casing and the soil. Starting from an exposed end of the pipe, this friction accumulates along the length of the pipe. If free movement is possible, the friction reduces the pipe movement and, if the pipe is long enough, it can be sufficient to completely suppress movement in the middle section. This fixed section of the pipe is called the adhesion zone. It forms what is known as a natural anchor. On pipes with no adhesion zone and consistent covering, the middle point of the pipe is the natural anchor.



Figure 1: Illustration of the structure of a bonded pipe and a casing joint

Figure 2 illustrates this process depending on a defined temperature difference ΔT .

- Case 1 shows the change of length Δl along the length of the pipe "L" as a temperature-dependent movement of the pipe in the theoretical case where there is no inhibition due to friction. Because there is no friction, the result is the theoretical expansion; no axial stress arises in the pipe here.
- Case 2 shows the movement of a filled pipe of the same length. In the sliding zone (G), in other words the zone where pipe movement occurs, there is friction, which accumulates as the length of the pipe increases. After the pipe length G, it reaches a level equal to the force caused by the movement of the steel pipe. From this point on, no pipe movement is possible.
- Case 3 shows that the lengthening caused by thermal expansion and the shortening caused by the generated compressive force are inversely equal.

Standardized **technical rules** and principles are necessary in order to maintain the supply of district heating and thus serve the public good.

They must reflect the **current state of technical knowledge**, particularly safety requirements, taking scientific and technical progress, as well as economic factors, into account.

AGFW as a recognized association has taken on the task of compiling standardized technical rules and issuing them in the AGFW codes of practice.

The AGFW codes of practice include **technical rules** and **technical notes**.

Abstract from AGFW-W „FW 100“

The **technical rules** provide a benchmark for effective technical procedures, which is also important from a legal point of view.

If the technical rules contain specifications regarding safety requirements, these can be assumed to be **recognized codes of practice**.

The safety requirements in the technical rules must always be observed in order to prevent persons and property being put at risk. In exceptional cases, the technical rules can be departed from if the same safety can be achieved in another way.

Abstract from AGFW-W „FW 100“

AGFW worksheets contain **designs and procedures** which have proven successful in practical use and have generally satisfied experts in the field that they are effective technical solutions.

In particular, they include safety requirements for the planning, construction, operation and testing of systems, facilities and products related to combined heat and power, district heating and cooling, as well as the properties of the heat or cooling carrier or pumped fluid.

Abstract from AGFW-W „FW 100“

The AGFW **worksheets** are produced in collaboration with all interested groups of experts.

This ensures that they are technically correct and are recognized by district heating supply specialists.

The AGFW worksheets are therefore generally considered to be **recognized codes of practice.**

Abstract from AGFW-W „FW 100“

The AGFW codes of practice are free for anyone to use. However, when used, they must be applied correctly.

The AGFW codes of practice are **an important source of information** on the correct technical procedures in normal circumstances, but **not the only one**. They cannot cover every eventuality in which further action or restrictive measures may be needed. By application of the AGFW codes of practice one cannot abdicate the responsibility for his behavior.

Applying the AGFW codes of practice does not release anyone from responsibility for their actions. However, those who apply them are supported by *prima facie* evidence that they have adhered to the generally recognized technical rules and standards.

Abstract from AGFW-W „FW 100“

AGFW, as publisher of the AGFW codes of practice, is **authorised to enforce its copyright to them. It therefore owns, in particular, the rights to reproduction and distribution.**

As this work is a joint project, individual parties cannot enforce rights to the results of the AGFW codes of practice.

With consent from AGFW, technical rules and bulletins may also be translated into other languages.

Abstract from AGFW-W „FW 100“

The AGFW codes of practice are the result of a **continuous** cooperation of a multitude of voluntary employees from the public utility companies, the industry and the full-time employees of the association. This is an ongoing, continues process.

Some facts:

- » Approximately **2.000.000 EUR** worth of underlying technical expert reports
- » About **10 employees** of the AGFW headquarter in „Engineering and Standardization“ as well as „Organizational and Operational Safety“
- » About **700 employees** from public utility companies are organized in **50 committees** for the generation of the technical guidelines and the standardization

Quality management within the district heating section
not only helps to avert danger,
but especially serves to avoid tremendously high
damage-related consequential costs
(manufacturer, assembler, supplier).

**You cannot acquire quality by testing,
it has to be produced.**

my best choice district heating ...

because it's clean and helps,
to save CO₂ for a better environment.

Thank you for your
kind attention!

www.smart-heat-grid.de

district heating 
smart heat for my home.

