PTB

4. EMATEM Sommerschule

2. bis 4. September 2008 ***Kloster Seeon, Deutschland***

Normentwicklung EN 1434, Gesetzliches Messwesen

ref.: ***REPORT from the convenor of Working Group 2 to the TC,***
16th meeting of CEN/TC 176, Heat Meters in Stockholm, 24th-25th April 2008
<Report_2008_04_24_WG 2.doc>

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Hinweis

Darlegungen zur sehr schwierigen Entwicklung der zur MID harmonisierten Fachgrundnorm EN 1434 berühren interne Arbeiten der WG 2 und des CEN TC 176,
weshalb nur auszugsweise die Inhalte der einzelnen Workitems - aber traditionell im vollen Wortlaut - referiert werden.

Die nächste Entwurfsfassung der Norm ist
etwa 2010 zu erwarten.
Leitfassung ist die englische Ausgabe, weshalb die im nachfolgenden Vortrag zitierten Texte zur Information zum Originalstand April 2008 erscheinen.

Stockholm, April 2008: CEN/TC 176 N 98 vers. WG 2, Overview/results concerning 17+1 work items

No	*Status √: ready*	*Priority*	*Deadline for WG 2*	*Importance*	*WG2 Ressourc. + descriptions*	*Title of work item*
0	***√: see CEN-Report for vote***	**Top**	**June 2007**			**Cross ref. list to MID (To be distributed to the TC-members for adoption.)**
1+10	***√ new test point table for parts 4+5***		Ref IWI 14			**Practical handling of the calculations at the testing of temperature sensor pairs, combined with new test points for large temperature ranges for combinded cooling/heat meters; not reduced MPE**
2	***√ in principle, Finalize for part 1 clause 12***	H	Ref IWI 14		**ask TC for external reference standard regarding disposal**	**Maintenance, repair and cleaning instructions**
3	***In work, √ in principle***	M	Report 2009	High	**Experiments for additional depositions of ingredients (AGFW Hamburg)**	**Accelerated, alternative to no. 6.8 p.4 Durability Test, that also takes into account the influence of pollution on durability**
4A	***√ P_{min}-*** **defintion + ref. to EN 14154**		Ref IWI 14	Low		**Specifications and tests for the pressure influence on flow sensors (Define the problem, introduction of P_{min})**
4B	***Limited pressure diff.betw. flow/ret.***		Report 2008			**Pressure difference influence on heat coefficient**

WI #1+10: approximated to the German PTB TR K 7.2:

Test points	Test temperature range	
Θ_1	Θ_{min} to (Θ_{min} + 10 K)	
Θ_2	$\frac{\Theta_1 + \Theta_3}{2} \pm 5K$	
Θ_3	$\Theta_{max} \leq 150$ °C	(Θ_{max} - 10 K) to Θ_{max}
	$\Theta_{max} > 150$ °C	(Θ_{max} - 20 K) to Θ_{max}, but in any case more than 140 °C

These new suggested test temperature ranges are the result of physically analyses to meet the MPE of temperature sensor pairs under background of the behaviour of the additional measurement uncertainty (caused by the interpolation error over the temperature range for the pair) at different test temperature points for single sensors (see document CEN/TC 176/WG2 N 167).

12 Information to be delivered with the meter or sub-assemblies

12.1 **Installation instructions** under the following headings shall include at least the following information:

WI #2: Maintenance, repair and cleaning instructions
(already included in German EG-Type Approval Documents

a) Flow sensor

12.2 **Parameter setting instructions** under the following headings shall when applicable include at least the following information for the setting procedure and a verification check of the result.

a) Flow sensor

- Nominal meter factor (litres/pulse or corresponding factor) for normal and test output
- Sampling frequency , - pulse shape, duty cycle (bursts) and amplitude, if applicable
- Security sealing procedures, electronic and/or mechanical

b) Calculator

- Nominal meter factor for flow input signal pulse shape, duty cycle (bursts) and amplitude, if applica
- Flow sensor in high or low temperature pipe
- Type of temperature sensor (e.g. Pt100 or Pt500)
- Nominal value of possible output signal
- Display resolution and settings
- Sampling frequency
- Operation, service or test mode
- Security sealing procedures, electronic and/or mechanical

12.3 **Adjustment instructions** under the following headings shall when applicable include at least the following information:

a) Flow sensor

- Adjustment procedure
- Security sealing procedures, electronic and/or mechanical

b) Calculator

- Adjustment procedure
- Security sealing procedures, electronic and/or mechanical

12.4 **Maintenance instructions** under the following headings shall when applicable include at least the following information:

a) Flow sensor

- Cleaning procedure
- Battery replacement procedure
- Parts that are recommended to be especially checked or replaced at revision
- Any needed special tools or equipment
- Security sealing procedures, electronic and/or mechanical
- Visual and acoustic inspection

b) Temperature sensors

- Visual inspection

c) Calculator

- Visual inspection
- Battery replacement procedure
- Security sealing procedures, electronic and/or mechanical

12.5 **Hints for disposal instructions**

The disposal instructions should stand under the headings batteries, parts with hazardous electronics, parts with electronics which are not hazardous, pure mechanical parts and pure plastic.
The WG 2 asks the TC 176 if no.12.5 should be better referenced by another EN-standard which is specified on disposal.

Status of work: ready, but need help reg. to no. 12.5
WG 2 recommends to the TC the adoption of the presented suggestion for the minutes, reg. to a future enlargement of clause 12 of part 1 of the standard.
It is to clarify by the TC if the disposal instructions should be referred by another, suitable EN-standard.

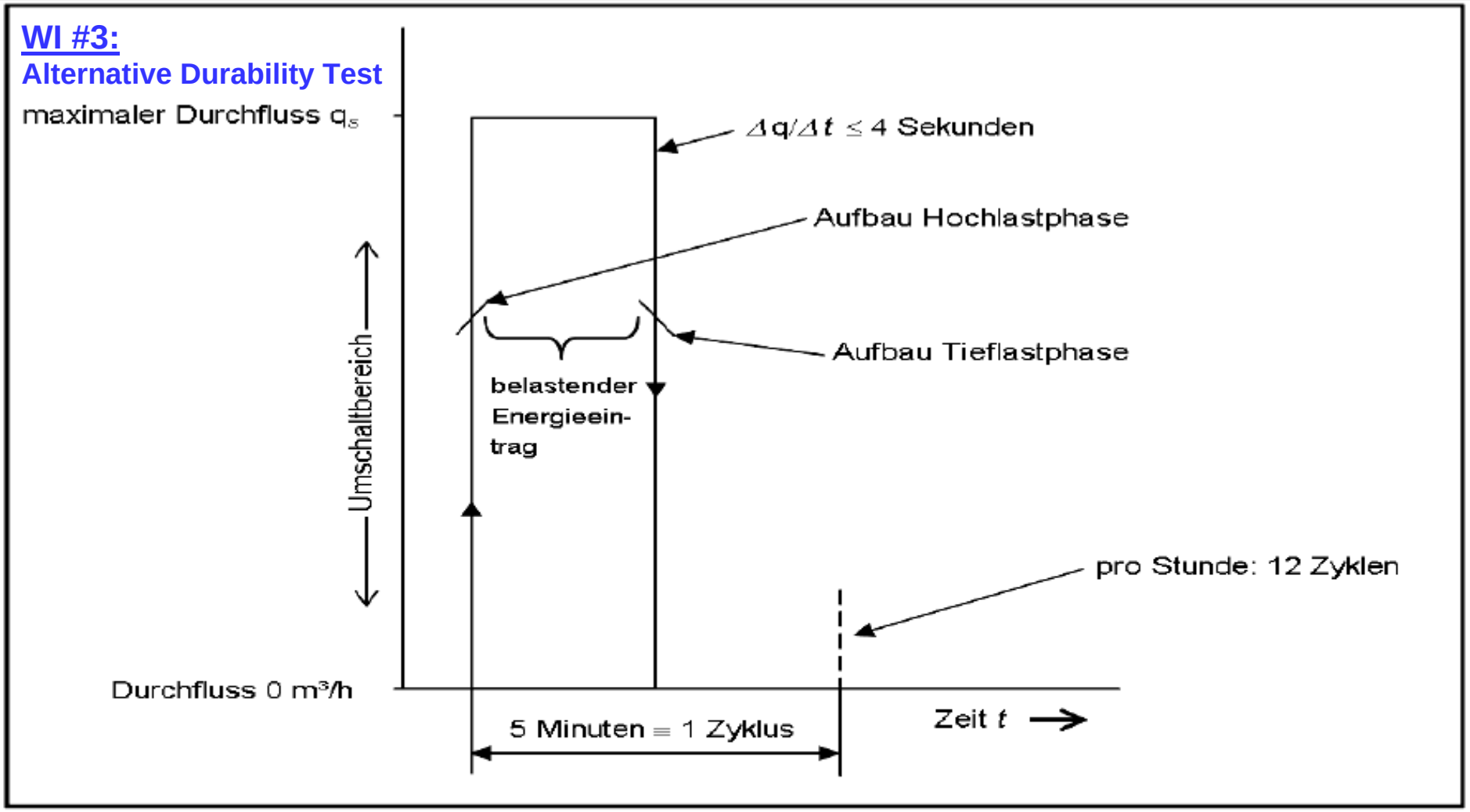


Bild 2: Lastwechselprofil der Stresszyklen beim neuen beschleunigten Abnutzungstest der PTB,
Umschaltpunkte bei mechanischer Sensorik: Durchflusswert 0 m³/h und Durchflussgrenzwert q_s

created by PTB with VDDW

WI #3:
Alternative Durability Test

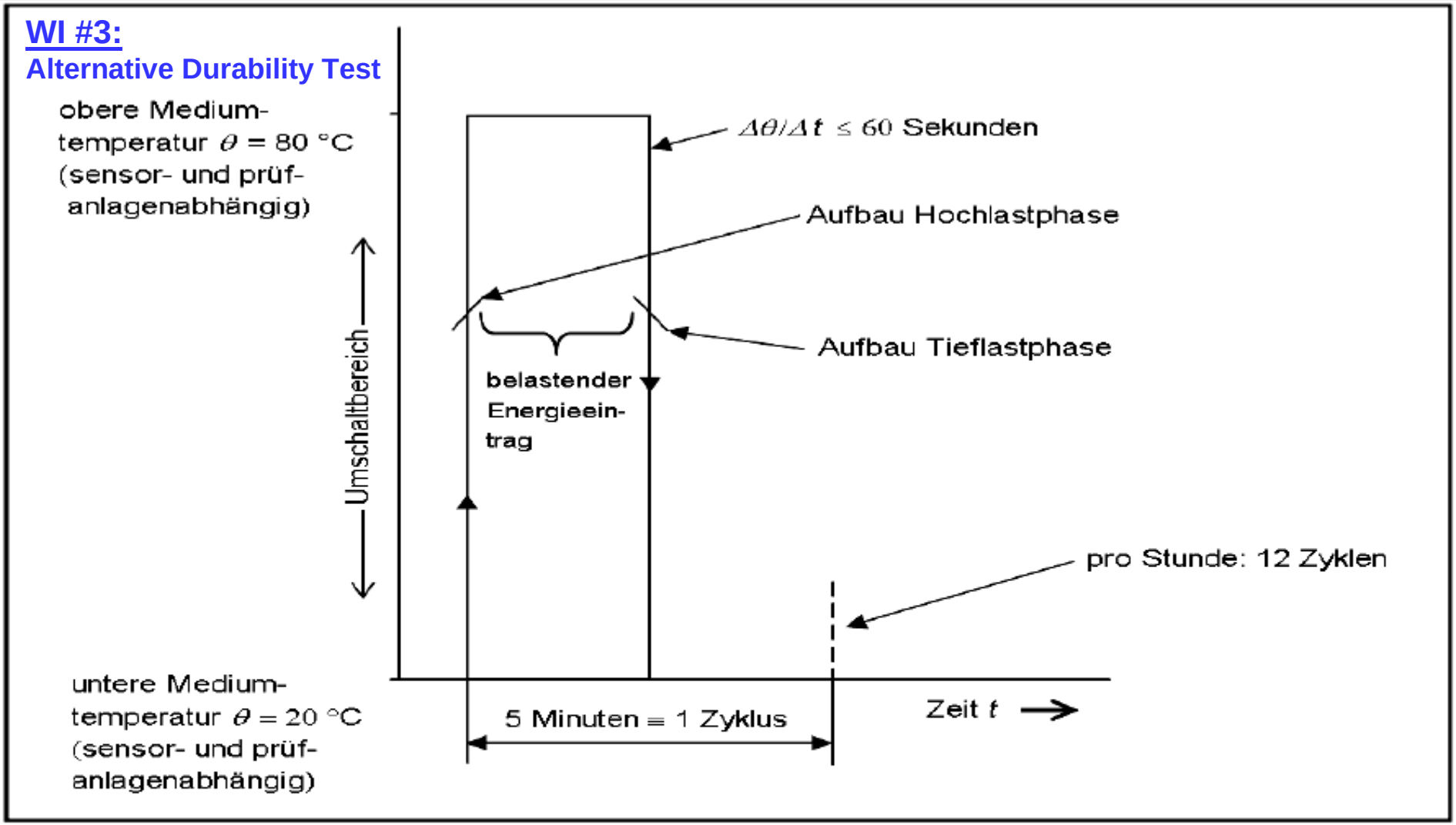


Bild 3: Lastwechselprofil der Stresszyklen beim neuen beschleunigten Abnutzungstest der PTB,
Umschaltpunkte bei elektronischer Sensorik: untere und obere Medium-temperatur

created by PTB with VDDW

Rigs for durability tests on mechanical and electronic flow sensors

WI # 3

The present load-change durability test in part 4, no.6.8 takes to much time and is to much expensive. For an acceleration the WG 2 suggests a new developed load-change test (done by PTB with German manufacturer's organization VDDW, see documents no. CEN/TC 176/WG2 N 111, CEN/TC 176/WG2 N 173). WG 2 recommends the following formulation included in clause 6.8.2.2 of part 4 of the standard:

"To accelerate the basic test procedure the samples may be weared alternatively by 4 000 continuous load change cycles, flow sensors with moving mechanical parts with flow rate load changes shall be raised up from zero to q_s (at a temperature of 80 °C to 85 °C) and reversed and flow sensors without moving mechanical parts with temperature load changes shall be raised up from (20 to 15) °C to (80 to 85) °C and reversed. Each low load phase and each high load phase has to last 2.5 minutes. The test shall be done with 6 samples of identical flow sensors for those sizes for which the highest wear is expected.
The 4 000 continuous load changes are estimated for a durability period of 5 years. The durability period is scaleable by its number of load cycles. "

Caused by this state of the art the WG 2 formulates the following addition of text to clause 6.8.2.1 (General):

"If assumed that there is a specific influence on the sensor's durability by particles in the energy-conveying liquid the test water shall be contaminated by ingredient compositions depending on the material composition of the measuring channel, e.g. by adjunction of Magnetite particles."

WI # 4A

The demarcation of the problem "specifications and tests for the pressure influence on the flow sensor's metrological performance" showed that two influences have to be selected (see documents CEN/TC 176/WG2 N 175 and N 156):

First, the reference to ISO 4064-3 in part 4 no.6.19 should be substituted with the pressure loss test equipment in EN 14154-3 Ann. D. There an approved test procedure for water meters - especially the measuring section - is described, and this standard belongs to the harmonized one to MID.

Second, limits of working pressures PS and P_{min} should be included by substitution of the current text of clause 5.5 in part 1 of the standard, suggested with the following:

"5.5 Limits of working pressure (PS an P_{min}):

PS is the maximum positive internal pressure that the heat meter can withstand permanently at the upper limit of the temperature range, expressed in bar.
P_{min} is the lowest pressure permitted in order to avoid deterioration of its metrological performance, e.g. cavitation.

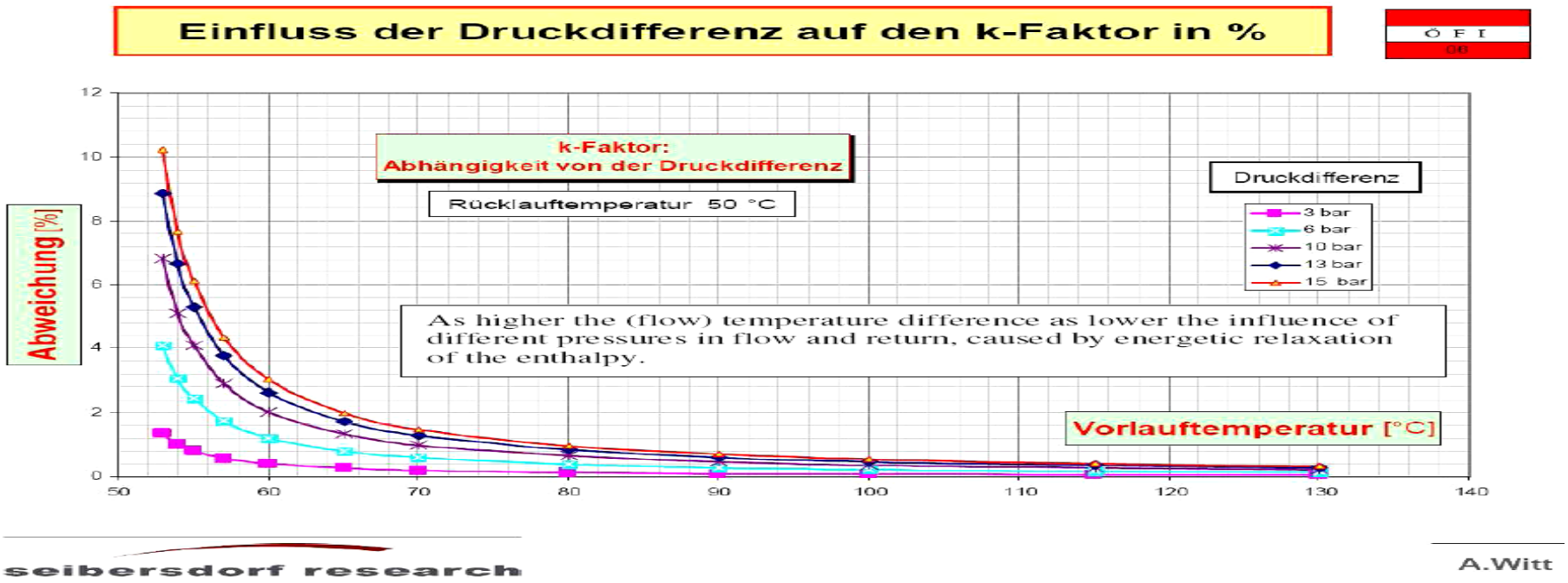
Note: P_{min} is depending on flow rate and temperature".

To part 4 no.6.4.2.1 General and part 5 no.5.2 the following sentence should be added:

"Test of flow sensors shall be done above minimum operation pressure specified by the manufacturer with examination of absence of cavitation."

WI # 4B **Important at small $\Delta\theta$, calculations independent checked by DELTA and other WG 2 members**

Difference pressures between the flow and return lines influence the heat coefficient and mean losses of thermal energy countered (see the document Witt_ heat_coeff_seib.pdf):



That's why in part 1, Scope, a second sub-clause should be added with
"This standard covers meters for closed systems, where the pressure drop over the thermal load system is typical 1 bar or lower."

And add at the end of clause 4.1 of part 6:
"The heating system shall be a closed system, where the pressure drop over the thermal load is typical 1 bar or lower."

Add at the end of Annex A of part 6, (A.4 under last index):
"The installation point of the heat meter in a secondary system (substation) shall be before the pressure regulating valve, to avoid deterioration of its metrological performance."

For more information: Report for „EHP Task Force Substation" (by Bo Frank)

5	***√ Def. + Test descript. part 4+5***		Ref IWI 14			**Trigger values for switch over from heat to cooling register on the meter**
6	***√ in prin-ciple, Finalize***	M	Ref IWI 14		**acceleration of test realized by aggressive atmosphere**	**Standing condensing on cooling meters (Define the problem): Not a corrosion test**
7	**In work**	M	Report 2009	?	**Input needed by manufact. + notif.bodies**	**Influences meter to meter at testing, dependence of meter sequence (Define the problem)**
8	***√: ref. to Welmec Guide 7.2***		Ref IWI 14			**Test for absence of software interaction between metrologi-cal core and additional functions: Heat and Cooling meters belong to P-meter type and are classified in Risk Class C (only structure chart testing)**
9	**In work**	M	Report 2009		**enhancement to "quality of installation"**	**Quality of electrical contact surfaces, added text for part 6, requirements, tests**

WI #5: Testing for combined cooling/heat meters, approximated on the German PTB TR K 7.2:

rameters were defined for switching over between heating and cooling energy, the so called **threshold value $\Delta\theta_{hc}$ with positive respectively negative polarity** and an **optional switching over** (offset-/dwell-) **temperature θ_{hc}** around **$\theta_{forward}$**, whereat with respect to part 1, no. 5.2.3 and no.7.2, the meter's performance at the lower limit of the temperature difference $\Delta\theta$ in both polarities has to meet the maximum permissible errors. The new parameters require functional tests introduced in part 4 and part 5 of the standard. Two new pa-

Therefore WG 2 proposes the following into several parts and clauses of the standard:

a) Add in clause 5 of part 1 (5 Rated operation conditions, 5.1 Limits of temperature range):
   5.1.3 Optional switching over temperature θ_{hc} for switching over between heating and cooling energy and reversed in combined meters for heating and cooling applications
   5.2.4 Threshold value $\Delta\theta_{hc}$ for switching over between heating and cooling energy and reversed in combined meters for heating and cooling applications

b) Add in clauses 11.4 and 11.5 of part 1 (11 Heat meter specification, 11.4 Calculator, 11.5 Complete meters):
   - **Threshold value $\Delta\theta_{hc}$ [in the range of ± (0 to 0.5) K]** for switching over between heating and cooling energy and reversed in combined meters for heating and cooling
   - **Optional switching over temperature θ_{hc}** for switching over between heating and cooling energy and reversed in combined meters for heating and cooling

c) Add at the end of clause 6.4.3 of part 4 (Performance test) and at the end of the clauses in part 5, no.5.4 and 5.7:
   Additional test for combined meters for heating and cooling:
   The switching over from heating to cooling register and reversed shall be a function of the polarity of the temperature difference $\Delta\theta_{hc}$ as well as of the optional specified switching over temperature θ_{hc}.
   It shall be tested that
   - **heating energy** shall only be recorded **at $\Delta\theta > \Delta\theta_{hc}$ and at $\theta_{forward} > \theta_{hc}$, at the lower limit of temperature difference $\Delta\theta$ without the maximum permissible errors being exceeded.**
   - **cooling energy** shall only be recorded **at $\Delta\theta < \Delta\theta_{hc}$ and at $\theta_{forward} < \theta_{hc}$, at the lower limit of temperature difference $\Delta\theta$ without the maximum permissible errors being exceeded.**
   - no heating and cooling energies shall be recorded between the switch over limits $\Delta\theta_{hc}$
   - correct heat coefficient is used (depending on installation of the flow sensor in higher respectively lower temperature $\theta_{forward}$)

WI #6: New test for cooling meters, in addition to no. 6.9 of part 4, Damp heat cyclic:

6.9.2 Damp heat steady state

Meters or sub-assemblies for cooling purposes with IP class 65 (normally the hydraulic part of the flow sensor and the temperature sensors) shall also be exposed to "Damp heat, steady state" under the conditions below:

Reference to standard: EN 60068-2-78, Test Cab, "Damp heat, steady state"

The test specimen shall be operated with liquid at a temperature of 6°C (± 3°C) flowing through the flow sensor and the temperature sensors shall be mounted in the same pipe. Separate mounted calculators and flow sensor electronics shall not be included. Test conditions shall be 50°C (± 2°C) and 95% RH (± 3%) for a testing period of 96 hours.

The test specimen shall be switched ON during the entire exposure and operate according to the conditions for RVM measurements

Intrinsic error determination on the flow sensor at these conditions shall be carried out before and after this test, at ambient conditions. No significant fault shall occur.

The temperature sensors shall be tested before, and during the last 12 hours of, the testing period. The insulation resistance between the metal envelope of the sensor and each of the conductors, connected to it, shall be measured using a test voltage not exceeding 100 VDC. The polarity of the voltage shall be reversed. The measured resistance shall in no case be less than 100 MΩ.

NOTE: A liquid temperature of 6°C will ensure continuous condensation without the need for a cyclic test. This means that from the condensing point of view this test is more severe than a cyclic test of the same duration.

WI # 7:

WG 2 agreed with the problem "Influences meter to meter at testing" that the notified bodies have to ensure that every single meter meets the MPE during verifications, when featuring acc.to the MID modules F, D and H1. Therefore already performance tests should be done during assessments acc. to MID module B.

But there are a lot of influences, depending on the meter type and test rig construction/technologies, materials, with view on economy: optimized length of distance pieces in systems of tubes, flow profile influences: especially the disturbed downstream velocity distribution behind a single flow sensor, in case of ultrasonic meters: the separation of US-signals vagabonded etc. (see document CEN/TC 176/WG2 N 184).

May be that the "standard recipe", the cyclic change of the positions of the flow meters within the line-test rigs with checking that every single flow sensor meets the MPE is the best, but this would not be the best solution during conformity assessments in modern times, characterized by quick changes of normally different meter types. Modern production times mean the fact, that prior verification individual calibration processes of each flow sensor will have happened.

Status of work: error influences allowed < 1/3 range of MPE,
as for testing of influences of pockets for temperature sensors

WI #9: Quality of electrical contact surfaces

After a discussion it was clarified that the reported problems mainly seems to be the connections of the cable between the temperature sensors and the calculator. It seems that, where a too small cable is inserted trough a too big cable inlet, damp can enter and generate unwanted corrosion that spoils the contacts.

WG2 recommends the

- installer to be observant to this problem
- meter supplier to check if the optimal solution of cable inlets are used

May be additional hints could be

- use 4-wire temperature sensors
- use Pt 500
- ask the meter supplier not only to specify the maximum cable diameter but also the minimum diameter

Status of work: ongoing, don't need external help

WG 2 recommends for the minutes of the TC meeting the adoption of the stand of discussion for future enlargements of parts 2 and 6 under the scope "enhancement to quality of installations"

11	***√: Annex C part 4, Referen-ce to ex-ternal Guide-line***	H	Ref IWI 14			**Definitions and key-codes of a "fully developed" flow profile (note to Part 4, no. 6.22)**
12	***√in principle***	M	Ref IWI 14		**tune formulation (to be finished)**	**Testing + adjusting with data signals**
13		M	**Has to be cleared in the Report 2009.**		**Input from differnt external sources, WELMEC WG 11 Task**	**Monitor the MID development to see if we have to add something about the "Same sign rule": Was made origin. for Gas meters or pe-trol pumps to avoid biasses of errors into one sign direction, if happens (consumer protection). Tool: < ½ of MPE during verification are allowed.**
14		**H**	**June 1st 2009**	**H**	**internal**	**Predraft of the decided ammendments, ready to include in the standard.**
15		H	**Report 2009**	H	**Input from DELTA**	**a) ½ or 1/3rd MPE influcences of pockets** **b) Testing procedure as simple as possible** **c) Up to now not enough samples for testing:** **c1) pocket influence** **c2) naked sensor**

ANNEX C
informative
Criteria for a fully developed flow profile

To state fully developed velocity distributions it is recommended that the following measurements should be carried out in the test lines of the calibration facilities:

1. By comparison between the fully developed flow profiles according to the theoretical velocity distributions for laminar flows according to HAGEN-POISEULLE resp. to GERSTEN&HERWIG/SCHLICHTING for turbulent flows with the curves measured by state-of-the-art techniques, e.g. Laser-Doppler-Velocity under at least horizontal and vertical centric traces, the deviations of the velocities at the AICHELEN' and centric points shall not be more than 5 %.

2. The measurement locations at the test bench shall be the same as for the locations of the flow sensors under test and additional at the inflow of the test bench with the maximum of diameter. Flow test points are at q_l, at $0{,}1 \times q_p$ and q_p. Medium temperatures are at q_i : (20 ± 5) °C, at $0{,}1 \times q_p$ and at q_p : (50 ± 5)°C.

3. The tangential deviation (swirl angle) calculated by the tangential and radial velocities in flow direction shall not be more than 2°. The swirl angle has to be measured at q_p with the minimum diameter of the tube of the test bench, as the swirl angle will increase at q_p with the minimum diameter of the tube of the test bench.

State of the art for use in conformity assessments is the technical regulation "GL_Validation_Test_Benches_0407e.pdf" which is recommended for use. It describes the measurement techniques, including the characterizing ranges of key codes for the assessments, which are:

- Profile factor K_p in the following range: $0.8 \le K_p \le 1.3$,
- Asymmetry factor K_a in %: maximum value $K_{a,max} = 1$ %,
- Turbulence factor K_{tu}: maximum value $K_{tu,max} = 2$,
- Swirl angle in degrees: maximum value $\Phi_{max} = 2°$

The flow rates corresponding to q_l, 0.1 × qp and q_p of the chosen pipe size and of the largest flow rate range of the flow sensors to be calibrated are to be taken as the test flow rates.

Please note the necessity of a relatively low test temperature at *qi*, this is reasoned by the Earth's gravimetry which influences the flow velocimetry distribution. We have found that the disturbingly influence is smaller in relation to a higher temperature.

These suggested criteria are the result of very intensive researches by the "Task Force Laseroptical FLOW DIAGNOSTICS PTB-METAS-BEV-OPTOLUTION-ILA" which is the publisher (for the bibliography) of the referenced Technical Guidelines (see document no.CEN/TC 176/WG2 N 106):

Task Force laseroptical FLOW DIAGNOSTICS	Validation of Test-Benches	➢ PTB - Heat (D) ➢ PTB - Liquids (D) ➢ METAS – Flow (CH) ➢ BEV – Flow (A) ➢ OPTOLUTION GmbH (CH) ➢ ILA GmbH (D)

„Guidelines for the Fluid Mechanical Validation of Calibration Test-Benches in the Framework of EN 1434"

- March 2007 -

Contents:

Benannte Stelle PTB Berlin, Anwendung LDV-Prüfrichtlinie bei Durchflusssensoren von Wärme-/Kältezählern

PTB

Zielstellungen und Vorteile:

Durchflussprüfeinrichtungen werden vergleichbarer, Erkennen von Schwachstellen bzw. Ursachen für Prüfabweichungen, Justier- und Kalibriergenauigkeit steigt ab Werkauslieferung (Anwenderforderung nach höherer Messgenauigkeit bei Abrechnung), Maßnahmen zur Prüfstandsüberarbeitung basieren auf Erfahrungsschatz

Vorgebrachte Hauptargumente gegen Anwendung:

Bisher ist kein Beispiel bekannt, dass DFS infolge schlechter Zuströmbedingungen mit Abweichungen außerhalb MPE reagieren.
Kann LDV-Strömungsdiagnose auch bei DN < 25 ausreichende Messunsicherheit (gemäss RL 5 % für die lokale Geschwindigkeit) garantieren? -> Nachweis erbringen (AK PTB-METAS-BEV), fehlende Alternativen für LDV-Verfahren, Kosten

Prüfstände Staatlich Anerkannter unabhängiger Prüfstellen, Benannte Stellen Modul F und Eichbehörden:

Es werden Zähler unterschiedlichster Charakteristik (Messprinzip, Bauart, Hersteller, Alter) parametriert und geprüft, die sich völlig anders bei Strömungsunregelmässigkeiten verhalten, daher muss die Strömungscharakteristik der Prüfstände ***zumindest bekannt*** sein.

Schlussfolgerung: zwingende Anwendung für

- Teilnehmer bei Ringvergleichen
- Entwicklungsprüfstände Modul B und H1, da Bewertungsgrundlage Konformitätsuntersuchung
- dringende Empfehlung Produktionsprüfstände Modul D, Modul F, Eichämter: Inangriffnahme innerhalb der nächsten 2 Jahre

PTB

Bei Nichteinhaltung der Orientierungskriterien gemäss Richtlinie ist durch den Antragsteller nachzuweisen, dass die auf dem jeweiligen Prüfstand geprüften DFS nicht durch die prüfstandsspezifische Strömungscharakteristik unzulässig beeinflusst werden.

Hierzu: Vergleichsmessungen zwischen einem validierten Prüfstand, d.h. mit erfüllten Orientierungskriterien, und betroffenen Prüfstand mit DFS der darauf zu prüfenden Baugrössen, 1/3 MPE-Fehlerversatzregel (vergleichbar mit Beeinflussungsprüfung von Durchflusssensoren in Reihenprüfanlagen und Eignungsprüfung für Tauchhülsen von Temperaturfühlern)

Auswahl Baugrössen: Regeln für Familienbildung gem. EN 1434 und Welmec Guide WG 11 (Nenndurchmesser, Messraumkonstruktion usw.)

- **Details zur Durchführung und Akzeptanz der Prüfungen durch Benannte Stelle**

WI # 12: Testing and adjusting with data signals, in case of no standardized interfaces like NOWA/UNICON

EN 1434-2 clause 4.3:

For flow sensors having data test interface only (without high resolution pulse outputs), at least the following data shall be available: Unique meter ID and volume register.
The following text is proposed to be edited in the second line:
"…or data from a serial interface…" should be changed into "…or data from a data interface…" as "data should not be limited to serial data".

EN 1434-2 clause 4.4:

The following text is proposed to be added at the end of the chapter:
"For flow sensors ~~, without mechanical adjustment device ,~~ the adjustment ~~may~~ shall be available through a data interface, if the flow sensors are intended for re-adjustment. In any case the adjusting shall be protected by security sealing. This is not applicable for flow sensors with mechanical adjustment."

EN 1434-2 clause 5.5

The following text is proposed to be added at the end of the chapter:

"For calculators having data test interface only (without high resolution pulse outputs), at least the following data shall be available: Unique meter ID, energy register, volume register, inlet temperature and outlet temperature. Calculators intended for re-adjustment the adjustment shall be available through a data interface. In any case the adjusting shall be protected by security sealing".

EN 1434-2 clause 6

The following text is proposed to be added at the end of the chapter:
"For complete meters having data test interface only (without high resolution pulse outputs), at least the following data shall be available: Unique meter ID, energy register, volume register, inlet temperature and outlet temperature". Complete heat meters intended for re-adjustment the adjustment shall be available through a data interface. In any case the adjusting shall be protected by security sealing".

16		M	**Report 2009**	M		**Reference to EN 681-1, table 3 for correct mounting and influences of gaskets, for part 6 of EN 1434**
17		H	**Report 2009**	H	**internal, users, manufacturers**	**Overflow and resolution of display, no. 6.3.7 of part 1:** • **enlarge up to 6000 hours for 5 years durability,** • **add displaying of accumultated volume (5 digits, unit m^3)**

Absehbare Normerweiterungen / Items 2009 ff.

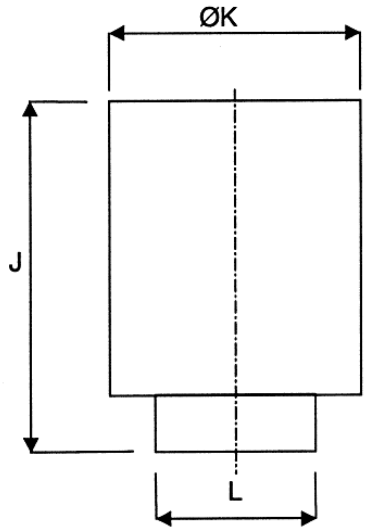
√ gesetzliche Rahmenvorgaben:
- Umsetzung EU-Richtlinie zur End-Energieeffiziens, Einsparpotenziale
- Erneuerbare-Energien-Wärmegesetz [EEWärmeG]:
  Haustechnik-Neubauten ab 31.12.2008 mit Pflicht zum anteiligen Einsatz regenerativer Energien, Grundlast- und Verteilzählung

- schnell ansprechende Wärmezähler, Definition und Prüfvorgaben

- „Smart-Metering“: durch EU-Kommission genehmigte, national eichpflichtige Zusatzfunktionen in EG-konformitätszertifizierten Wärmezählern/Teilgeräten, z.B. temperaturgesteuerte Energie-Zusatzregister, Lastgangzählung u.a. (prPTB-A 22.3 ff.)

- nicht-symmetrische Messung der Temperaturdifferenz, Prüfvorgaben, Einschränkung von Nennbetriebsbedingungen (absehbar deutsche Herangehensweise)

- Wasser-Glykol-Gemische: Neu-Defintion kalorimetrisch aktuell zu ermittelnder Wärmekoeffizienten in Funktion vom Lösungsverhältnis, Druck/-Differenz, Temperaturniveau und V/R-Differenz:
  Unsicherheiten, evt. Zusatzsensorik, Projektierung, Installationsvorgaben



Messkapselzähler, Zulassungsstand: EN 14154-1:2005 (E)

Table 3 — Concentric meter dimensions

Maximum dimensions in mm

	L	*J*	ϕK
Type 1	(G 1½ B) [a]	220	110
Type 2	(G 2 B) [a]	220	135
Type 3	(M62 × 2) [a]	220	135

[a] Metric or Whitworth threading at the choice of the manufacturer.

Entsprechend des wirtschaftlichen Bedarfs zum Einsatz neuer, EG-gekennzeichneter Messkapseln in bereits im Feld eingebaute EAS gemäß Übergangsregelung der 4.VO zur Änderung der EO vom Februar /2007 werden derzeit die technischen Prüfvorgaben für eine bis 2016 befristete Duldung von Kombinationen von einem AK des AA-Wärmezählers untersucht, Übergangsringe/Adapter sind verboten.

Die technische Eignungsprüfung von im Feld eingebauten Tauchhülsen zum Einsatz EG-gekennzeichneter TF wird ebenfalls von diesem AK bearbeitet, Ltg.: Dr. Lotfi.

- Feldidentifikation - messtechnische Prüfung, 1/3 MPE-Kriterium - Kennzeichnung

geplante Erweiterung der EN 14154, Gruppen von Zählern

- 1 Water Meters
- 2 Concentric Manifold Meters
- **3 Cartridge Meters**
  - Concentric flow pattern
  - Axial flow pattern
- 4 Insert Meters
  - Axial flow pattern
  - Vertical flow pattern
  - Combination

Kodierung Zähler und Anschluss - Schnittstelle

zentrale Verwaltung der Kodierung Zähler und Anschluss-Schnittstellen

öffentlicher Zugang zu Zeichnungen und Anschluss - Schnittstellen (wichtig für Befundprüfungen)

konzentrisch	Gewindeabmessung	Sitz
Typ C 1	G 1 1/2 B	16,1
Typ C 2	**G 2 B**	**16,1**
Typ C 3	G 2 B	14,5
Typ C 4	G 2 1/4 B	31,5
Typ C 5	**G 3 B**	**30,9**
Typ C 6	M62 x 2	24,5
Typ C 7	M64 x 2	29,1
Typ C 8	M65 x 2	41,9
Typ C 9	**M65 x 2**	**29,1**
Typ C 10	M60 x 3	14,5
Typ C 11	M50 x 3	14,8
Typ C 12	M60 x 2	14,35
Typ C 13	**M82 x 1,5**	**14,00**
Typ C 14		

Ansprechpartner im AA-Wärmezähler: Herr Klassen

Aufnahme von AGFW- und anderen Richtlinien in „Anerkannte Regeln der Technik“, Durchsicht auf zeitgemäße Verwendbarkeit, ggf. Überarbeitungen

- AGFW-Regelwerke spiegeln Stand der Technik in Fernwärme und Haustechnik wider, werden regelmäßig überarbeitet. Synergieeffekte entstehen, wenn know-how des PTB-Zulassungsbereiches Wärmezähler in gemeinsam betriebenen Entwicklungen einfließt.

- Bestimmte Regelwerke werden in Verzeichnis „Anerkannte Regeln der Technik“ aufgenommen, Stärkung internationale Akzeptanz bei Normentwicklung

- copy-right bei AGFW, Eichbehörden und PTB für interne Zwecke unentgeltlich, down-load durch Dritte nicht möglich und kostenpflichtig (Vorgehensweise entspricht kostenpflichtiger Verwendung publizierter Industriestandards)

<u>Beispiele</u>

- FW 202 „Ausführung und Einbau von Temperaturfühlern für Wärmezähler, Inhalt auf Übereinstimmung mit neuer Eichordnung prüfen (direkter TF-Einbau)
- FW 201 „Ordnungsgemäße Instandhaltung von Wärmezählern und Wärmezähler-Teilgeräten“, Inhalt auf Übereinstimmung mit TR K 7.1/7.2 prüfen
- FW 211 „Anforderungen an Zähler, die zur Kältemessung eingesetzt werden“, Inhalt auf Übereinstimmung mit TR K7.2 prüfen
- FW 510 „Anforderungen an das Kreislaufwasser von Industrie- und Fernwärmeheizanlagen sowie Hinweise für deren Betrieb“, Inhalt mit den neuesten Erkenntnissen der Wasserchemie abgleichen
- Die Rechenwerkprüfung wird innerhalb eines neuen AGFW-Arbeitsblattes bearbeitet.
- „Richtlinie zur strömungstechnischen Validierung von Kalibrier-Prüfständen“ (AG aus METAS, PTB, BEV)

4. EMATEM Sommerschule

2. bis 4. September 2008 *Kloster Seeon, Deutschland*

Normentwicklung EN 1434, gesetzliches Messwesen

Besten Dank für Ihre Aufmerksamkeit !

Dr. Jürgen Rose
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