Annex 2

REVERIFICATION PERIODS – WATERMETERS

In laying down the parameters of regulation in legal metrology, such as reverification periods, there are always conflicting interests, including those of stakeholders with strong economic motivations. As a result, the reverification periods of some measuring instruments are not in line with the strictly technical metrological considerations.

Economic pressures cannot be ignored, even in principle, since an item's purchase price must include the cost to install it, the costs to take it out from its place of use to reverify it, and the cost to repair it if necessary. Such considerations have led to an ever-increasing use of statistical approaches to verification of measuring instruments or to their metrological control.

On the other hand, governments must also take into account the interests of consumers and act as their protector against manufacturers and other, more audible, lobby groups. Collection of data on metrological properties and their time dependence in real conditions is a preferable option here. In the case of watermeters, that means gathering data from distribution networks prior to any external interventions (cleaning, repair etc.) that would normally precede the tests for subsequent verification. This matter has two important stumbling blocks:

1. the costs associated with these additional operations that will be eventually passed on to the user,
2. technical complications, such as the fact that testing equipment can be contaminated by impurities released from uncleaned watermeters.

It is therefore clear that collection and evaluation of such data in the public interest has to be financially supported by the government. The data obtained in this way can be used as a feedback to analyze whether reverification periods have been set down correctly or to assess the consequences of the observed deviations from any optimal performance.

Three years ago a program of such systematic studies into the correctness of reverification periods was launched by the Government of the Czech Republic. (A similar project on gasmeters is into its second year.) Under its carefully crafted terms of reference, data on watermeters were collected in cooperation with utility companies. A sampling plan was chosen with the aim of covering the most frequent measuring ranges and types of those measuring instruments. The data exhibit a much greater dependence on specific conditions in various localities, quality of distribution networks (piping etc.) and quality of the media being measured, than on types and ranges of those measuring instruments. The results so far demonstrate some interesting trends but before final conclusions (of quite serious consequences) are drawn it appears that additional data on larger batches have to be collected to achieve statistically reliable results.

To illustrate the findings some results for watermeters are given in the following tables (distribution networks mentioned are various regions in the country):

Table no.1: Distribution network A

Type X Q_n 2.5	number of units tested	non-compliance units	non-compliance %
after 1 year	50	9	**18**
after 3 years	50	10	**20**
after 5 years	50	12	**24**
after 6 years	50	12	**24**

Table no.2: Distribution network B

Type X Q_n 2.5	number of units tested	non-compliance units	non-compliance %
after 2 years	186	99	**53.2**
after 4 years	120	91	**75.8**
after 6 years	190	124	**65.3**

Type Y Q_n 6	number of units tested	non-compliance units	non-compliance %
after 2 years	51	29	**56.8**
after 4 years	55	38	**69.0**
after 6 years	30	10	**30.3**

Table no.3: Summary of results highlighting the time dependence and the rate of non-conforming measurements for individual flowrates of Q_n 2.5 watermeters

Number of units		distribution network A		distribution network B	
Tested		units		units	
	in total	200		496	
	after 1 year	50		-	
	after 3 (2) years	50		186	
	after 5 (4) years	50		120	
	after 6 years	50		190	
Non-complying		units	%	units	%
Total	in total	43	21,5	314	63.3
	after 1 year	9	18,0	-	-
	after 3 (2) years	10	20,0	99	53.2
	after 5 (4) years	12	24,0	91	75.8
	after 6 years	12	24,0	124	65.3
Q_{min}	in total	24	55.8	156	49,7
	after 1year	4	44.4	-	-
	after 3 (2) years	7	70.0	25	25.3
	after 5 (4) years	9	75.0	37	40.7
	after 6 years	4	33.3	94	75.8
Q_t	in total	17	39.5	233	74.2

	after 1year	4	44.4	-	-
	after 3 (2) years	2	20.0	56	56.6
	after 5 (4) years	3	25.0	68	74.7
	after 6 years	8	18.6	109	87.9
Q_n	in total	7	16.3	233	74.2
	after 1year	2	22.2	-	-
	after 3 (2) years	2	20.0	69	69.7
	after 5 (4) years	2	16.7	64	70.3
	after 6 years	1	2.3	100	80.6
Q_{min} & Q_t	in total	4	9.3	130	41.4
	after 1year	0	0,0	-	-
	after 3 (2) years	1	10.0	14	14.1
	after 5 (4) years	2	16.7	30	33.0
	after 6 years	1	2.3	86	69.4
Q_{min} & Q_n	in total	0	0.0	118	37.6
	after 1year	0	0.0	-	-
	after 3 (2) years	0	0.0	11	11.1
	after 5 (4) years	0	0.0	27	29.7
	after 6 years	0	0.0	80	64.5
Q_t & Q_n	in total	1	2.3	172	54.8
	after 1year	1	11.1	-	-
	after 3 (2) years	0	0.0	34	34.3
	after 5 (4) years	0	0.0	45	49.5
	after 6 years	0	0.0	93	75.0
Q_{min} & Q_t & Q_n	in total	0	0.0	112	35.7
	after 1year	0	0.0	-	-
	after 3 (2) years	0	0.0	8	8.1
	after 5 (4) years	0	0.0	24	26.4
	after 6 years	0	0.0	80	64.5