

## THE CONTROL EXPENDITURE AND QUALITY URBAN WATER BY NMR FLOWMETER - RELAXOMETER .

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The diminution of pure fresh water stocks and increase the payment for her is demanding from people rational use her. For this necessaring of urban water expenditure control accurate devices. The many people wants to control the quality urban water of besides the expenditure. This's important for residents at big city. In this city often the different damages occurred in the water - main which result the different chemical elements hit in the clearing water. In the world make many type devices for measuring the expenditure, the concentration different substances in the urban water. This devices use independently. The NMR flowmeter - relaxometer allowed to make the control expenditure and quality urban water of uncontact method by one device.

**KEYWORDS** : urban water, NMR flowmeter - relaxometer ,  
control expenditure and quality.

In last time the drinking water stocks are decreasing of constantly in the world because of the different causes. This particularly noticeably in countries of West Europe where the industry is increasing of constantly, the square forest and afforestation are decreasing, the peoples are increasing and the city is extending your territory. The tendention increasing consumption of water in the floor fund is observes for every country Europe and Russia. The tempo increase consumption of water is lowing of last time ( table 1 ).

**Table 1.** Consumption the water at person in the day in the litre for countries Europe and Russia.

Country	1996	1997	1998
Norway	172	174	175
Sweden	186	192	194
Finland	149	152	151
Denmark	183	186	190
Germany	149	147	146
France	152	154	159
England	141	139	136
Italy	224	221	220
Belgium	117	113	108
Spain	127	125	126
Russia	580	490	396

The analysed this date marked that Russia has big problems of contact with consumption water. The water is expending not economy. Don't think that in the countrys Europe people use of water for mode of life problems decision not seldom that in the Russia. The expenditure water is depending from culture her consumption which is forming at water control system. The mounting the water control exact devices in the home allowed :

- decreased the consumption water quantity ;
- decreased pressure in the magistral water - main that increased their time exploitation ;
- decreased quantity sewage water and unloaded the water sewage purification plants ;
- avoided supplementary invests at the water purification plants construction .

The main firms are making this devices : Zenner, Allmess, Spanner - Pollux, Wehrle ( Germany ), Sappel ( France ), Premex ( Slovan ), Danfoss A/S ( Denmark ), Micronics LTD ( England ). Fisher & Porter ( Germany ), ARAD ( Israel ), Badjer meter ( USA ), Willem ( Holland ).

They make in the basis devices which only measuring the water expenditure. The some firms make devices which allowed water expenditure measuring determined in it the harmful substances for man health : F, CL, Zn, S and many another. These devices had name NMR flowmeter - relaxometer. NMR flowmeter-relaxometer will be use for the another liquids expenditure measuring.

The spontaneous relaxation time  $T_1$  of the measuring flow liquid is appeared the main characteristic for NMR flowmeter - relaxometer . These devices used for the liquid expenditure measuring which has the relaxation time  $T_1 > 0.1$  s. The means  $T_1$  in the second for the different liquids given in table 2. They are showing the application possible these devices.

**Table 2.** The spontaneous relaxation time  $T_1$  the different liquids.

Name liquid	$T_1$ , s
Benzene	19
Acetone	15
Chlorobenzene	15
Ethyl ether	14.5
Toluene	12.5
Formic acid	8
Methyl alcohol	8
Cyclohexane	6.5
Nitrobenzene	6.5
Cellulose acetate	3.8
Water	3.6
Ethyl alcohol	3.5
Aniline	2.4
Benzine	2.3
Sulfuric acid	0.7

The main dignity NMR flowmeter - relaxometer in front of another type flowmeter - uncontacted. She achieved because the measuring schemes are contacting with flow liquid by the constanting and alternating magnetic fields which free are penetrating across the tubing walls. For this the tubing make of the unmagnetic material in the constanting magnetic field action zone - of the unmagnetic and unelectroconductor material. The another dignity - absolute measuring. The third dignity - possibility the measuring results transmission of the distance because the alternating voltage with radiofrequency is carrying the necessary informations.

The NMR flowmeter - relaxometer will working in the third regimes

1. In quality the water expenditure meter. In this regime the him metrological characteristics there are very comparison with the another type flowmeter.
2. In quality the water expenditure meter and her cleanlines indicator. For the determine the water cleanlines applicated the distinction measurable time  $T_1$  from time  $T_{1c}$  for the pure water. In the water has any annmixtures that the water time  $T_1$  is changing. The electronical scheme compared  $T_1$  with  $T_{1c}$  and given signal if the their dispating larger the definite limit.
3. In quality the water composition analyzer. This possibly because the nuclear magnetic resonance signals are observes at the different frequencys for the different chemical elements.

The NMR flowmeter - relasometer has the essential lacks which restricting their application :

1. The high cost 7000 - 15000 \$
2. The big mass 20 - 40 kg.

Therefore he used often in the industrial plants and powerstations.

## References

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