



(Moscow)

Contact Phones: **+7(495) 617-1945,**

+7(495) 617-1946;

E-mail: **svarog@svarog-uv.ru**

On State of Affairs in Ultraviolet-based Water Disinfection

At present the world community of the leading companies-manufacturers of water purification equipment is actively employing ultraviolet (UV) sources of new generation in water disinfection processes. These sources differ basically from ultraviolet lamps used over previous decades (such as Philips TUV) by substantially higher flux power of UV radiation. The norms and regulations of the USA, Canada, and most of European countries stipulate for UV flux density the level of not less than 40 mJ/cm^2 by the end of UV lamp service life. The projectible and abuilding water disinfecting stations in the USA foresee the UV flux density in the range from **50 to 100 mJ/cm^2** . Only such high levels of the UV flux density are actually the prerequisite for the effective inactivation of pathogenic microflora in water treatment systems. Exactly such figures were reported in all communications of the 2-nd International Congress on Ultraviolet Technologies held in Vienna in July 2003. In this case, the transparence of an aqueous medium should not be lower than 85% and the amount of suspension particles should not exceed 1 mg/l

In the majority of Russian regions (cities), the quality of water is appreciably worse with respect to the aforementioned parameters, whereas the UV equipment in use is mostly unable to provide doses of UV irradiation sufficient for the effective inactivation. The acting Russian norms and regulations on the UV flux density ($16 \div 20 \text{ mJ/cm}^2$) are beneath all criticism.

Therefore, the reports of Russian scientists on the state-of-the-art disinfecting technology that combined the simultaneous action of ultraviolet and ultrasound to water under treatment have excited keen interest among the specialists of the leading word companies. On the majority opinion, this technology is actually the break-through in the area of reagent-free water disinfection since under the combined action of ultraviolet and ultrasound, the energy consumption is as low as $5 \div 8 \text{ W/m}^3$. The expenses for disinfecting 1 m^3 water do not exceed 0.04 USD (in the USA this figure is 0.07 USD/ m^3).

Ultrasound prevents biofouling of surfaces of protective casings of UV radiators; moreover, ultrasound itself exerts the disinfecting effect. The effectiveness of this method proved during the four-year period of cooperative activities with the scientists of the United African Republic is higher by a factor of several hundreds compared to that of conventional UV systems. The proposed method of **Ultraviolet + Ultrasound** is most reasonable and economic way of water disinfection in housing (at the inlet to apartment houses), in particular, keeping in mind the growing resistance of pathogenic microflora to the action of UV irradiation (this effect is in fact observed over the last few decades). **In addition, the prices for our "Lazur"-series units, produced by other Russian companies (NVR, LIT, etc.) are appreciably lower.**

"Lazur" type units are already operating successfully in a number of residential areas of Moscow, offices, establishments, hotels, bath houses, and swimming pools. Among the end users of "Lazur" units and systems, there are the administrative buildings of the Russian Government and Moscow Patriarchate.

Andrey N. Ul'yanov
General Director of JSC "SVAROG"