

## Technical and Economic characteristics of equipment for water disinfection with ultraviolet rays treatment.

| №  | Model, Country, Field of application  | Productivity in L/min | Cost of purification of 1 m <sup>3</sup> of water, US\$ | Efficiency of Purification                        |   |   |                           |
|----|---|-----------------------|---|---|---|---|---------------------------|
|    |   |                       |   | Salination, micro-flora coverage of surfaces      | Bacteria units/L                        | Spores units/L                          | Viruses                   |
| 1  | MITA-Kian-200 France, State Programmes of Extreme Medicine                    | 7.2                   | 0.83  | considerable                                      | from 10 <sup>6</sup> to 10 <sup>2</sup> | from 10 <sup>6</sup> to 10 <sup>5</sup> | not efficient             |
| 2  | PROTERM (KSI 1-7) France  | 40.0                  | 1.3   | considerable                                      | from 10 <sup>6</sup> to 10 <sup>2</sup> | from 10 <sup>6</sup> to 10 <sup>4</sup> | not efficient             |
| 3  | BIM-T, Great Britain Corp. Programmes USA-Britain "The problems of surviving" | 6.8                   | 0.9   | considerable                                      | from 10 <sup>6</sup> to 10 <sup>4</sup> | not efficient                           | not efficient             |
| 4  | KOROS-VP-11 Great Britain-Sveden, Production of pharmaceuticals               | 43.0                  | 1.6   | considerable                                      | from 10 <sup>6</sup> to 10 <sup>3</sup> | not efficient                           | not efficient             |
| 5  | Hydro-TOR USA, NASA (COSRAM)  | 7.3                   | 0.6   | no data, small working resource (up to 300 hours) | from 10 <sup>6</sup> to 10 <sup>2</sup> | from 10 <sup>6</sup> to 10 <sup>4</sup> | not efficient             |
| 6  | Hydro-Flow USA (UV-6 series)  | 1.0 (specific 200)    | 0.4   | considerable                                      | from 10 <sup>6</sup> to 10 <sup>3</sup> | no data                                 | no data                   |
| 7  | Lazur-M 05, Russia, JSC "Svarog"  | 8.3                   | 0.04  | none  | from 10 <sup>6</sup> to 0               | from 10 <sup>6</sup> to 0               | from 10 <sup>6</sup> to 0 |
| 8  | Lazur-M 3, Russia, JSC "Svarog"   | 50.0                  | 0.02  | none  | from 10 <sup>6</sup> to 0               | from 10 <sup>6</sup> to 0               | from 10 <sup>6</sup> to 0 |
| 9  | Lazur-M 10, Russia, JSC "Svarog"  | 170                   | 0.01  | none  | from 10 <sup>6</sup> to 0               | from 10 <sup>6</sup> to 0               | from 10 <sup>6</sup> to 0 |
| 10 | Equipment UOVO395.05-02 (DRB-40 lamp) JSC "EGA + EGA Ltd" St.Petersburg       | 8.3                   | 0.3   | considerable                                      | from 10 <sup>6</sup> to 3               | no data                                 | no data                   |

1. Data on overseas analogs are presented on the basis of materials taken from exhibitions and periodicals.

2. Testing of UV-6 and UV-12 Series of Hydro-Flow (USA) equipment, which were carried out in 736 Center of Sanepidnador (Supervising Body for Sanitary and Epidemiology Control) under the Defense Ministry of the Russian Federation, has shown that technical characteristics proclaimed by the manufacturer do not correspond to the factually measured ones. For instance, UV-6 demonstrates sufficient anti bacteria activity (but still considerably less than that of Lazur-M05) only under 30-40 Liters per hour productivity rate instead of 200 Liters per hour specified by the manufacturer. Purified water does not conform to the requirements of GOST (State Adopted Standards) of Russia specified for drinking water.

3. Information on "Lazur" equipment series.3.1. "Lazur" equipment series are the only among all other equipment manufactured in Russia which were officially certified in accordance with the requirements of San PiN 2.1.4.559-96 applicable from 01.01.1998.3.2. Cost of disinfecting 1 Liter of water falls in 0.02-0.04 \$US range with calculations being made on the basis of exploitation cost obtained over the results of 3 year period of continuous work of the equipment on one of the sites, and includes all exploitation costs completely.3.3. Power needed for equipment of "Lazur" series is less than 8 Watt per 1 Cubic Meters of water. The same parameter of overseas analogs is 50 Watt per 1 Cubic Meters of water and upwards. "Lazur" device can operate with both power Supply unit (220-230V, 50Hz) and DC Battery 12V.3.4.

Equipment of "Lazur-M3" type is used for purifying water from soluble organic substances (oil products in particular) with concentrations of the latter being in the range of 2 mgr./L-0.05 mgr./L.

3.5. Starting from the second half of 1998 "Lazur" series are being equipped by power supply units with programmed control, which provide ultra long life (up to 10000 hours) and high stability for emitters. This beats the same parameters of all existing overseas and domestic analogs and makes it possible to purify water (up to 0) from bacteria, spores and viruses (hepatitis, poliomyelitis and other).

4. In domestic ultra violet disinfecting devices, produces by LIT Company (Moscow), JSC "EGA" (St. Petersburg) and other manufacturers use emitters which are of the same type as a very popular in the past antibacteria Lamp DB-40. Life time of such lamps equals to 2500 hours (3-4 months of continuous work). These devices do not work properly under unsteady power supply conditions and cause interferences in electricity. They suppress only the weakest species of the pathogen bacterial micro flora and do not conform to the requirements of SanPiN. The devices are susceptible to salination and micro flora coverage processes which in time change all their characteristics for the worse.

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