# THE PROMEDUSA SG-C1 MOBILE DISINFECTION CART

## **OZONATED WATER: UP TO 16 PPM OZONE GAS: UP TO 18 G/Hr**

### **Ozone Water Data**

| )zone   | e water decontami          | nation data                                  | Da  | ata by Minis        | try of H | lealth, Labour | and Welfare       |  |
|---|----------------------------|--|---|---------------------|----------|----------------|-------------------|--|
| Type of micro-organism                            |                            | Aqueous ozone<br>concentration<br>ppm (mg/l) | Concentration of<br>micro-organisms<br>(No./ml) | Temperature<br>(°C) | pН       | Contact time   | Death rate<br>(%) |  |
| Colon bacterium                                   |                            | 0.96   | 10 <sup>5</sup> cells                           | 21                  | 7        | 5 secs.        | 100               |  |
| Viable<br>bacteria                                | Staphylococcal bacteria    | 1.08   | 10 <sup>5</sup> cells                           | 21                  | 7        | 5 secs.        | 100               |  |
| Pseudo  | omonas aeruginosa          | 1.01   | 10 <sup>5</sup> cells                           | 21                  |          |                |                   |  |
| * (Bacillus tuberculosis) /<br>Bacillus subtillis |                            | 0.3 - 0.5                                    | 10 <sup>5</sup> cells 20                        |                     | 6.5      | 30 secs.       | 99.9              |  |
| Influenza virus                                   |                            | 0.96   | 1050 EID50                                      | 21                  | 7        | 5 secs.        | 100               |  |
| Clostridia  |                            | 0.96   | 10 <sup>5</sup> cells                           |                     | 7        | 5 secs.        | 100               |  |
| Perfring  | gens                       | 0.96   | 10 <sup>5</sup> cells                           | 21                  | 7        | 5 secs.        | 100               |  |
| Chicken encephalomyelitis virus                   |                            | 0.72   | 10 <sup>20</sup> EID50                          | 20                  | 7        | 5 secs.        | 100               |  |
| Canine  | infectious hepatitis virus | 1.2  | 1015 EID50                                      | 21                  | 7        | 5 secs.        | 100               |  |
| Canine  | parvovirus                 | 0.96   | 1025 TCID50                                     | 21                  | 7        | 5 secs.        | 100               |  |
| Chicke  | n coccidium                | 1.92   | Approx.<br>3 x 10 <sup>5</sup> cells            | 20                  | 7        | 30 secs.       | 100               |  |
| Mold  |                            | 0.3 - 0.5                                    | 105 cells                                       | 20                  | 6.5      | 19 secs.       | 99.9              |  |
| Yeast   |                            | 0.3 - 0.5                                    | 10 <sup>5</sup> cells                           | 20                  | 6.5      | 90 secs.       | 99.9              |  |

х

х

6

×

2.1 x 100 cfu/30 sec.

Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association

0

0

|                  | Dis              | infect             | ion ob         | ject               |             |   |                 |                  |   | 0                     | bject n                  | nicroo           | rganis                     | m                             |                                  |       |          |
|------------------|------------------|--------------------|----------------|--------------------|-------------|---|-----------------|------------------|---|-----------------------|--------------------------|------------------|----------------------------|-------------------------------|----------------------------------|-------|----------|
| Dis              | infect           | ant                | Wound          | l-healing          |             |   | /               |                  | T   |                       |                          |                  |                            |                               | Vir                              | us    | _        |
| Environment      | Appl<br>Metal    | iance<br>Non-metal | Fingers / Skin | Mucous<br>membrane | Excrement   | Disinfectant                              | Viable bacteria | MRSA             | Pseudomonas<br>aeruginosa,<br>sepacia, etc. | Pallidum<br>Treponema | Bacillus<br>tuberculosis | True fungi       | Spore bearing<br>bacterium | Medium size<br>containing fat | Small size not<br>containing fat | ЧИ    | חרע/ חפע |
| 0                | $\triangle$      | $\triangle$        | 0              | 0                  | ×           | Ozone water                               | 0               | 0                | 0   | 0                     | 0                        | 0                | 0                          | ×                             | 0                                | 0     | C        |
| Δ                | 0                | 0                  | ×              | ×                  | 0           | Sterihyde                                 | 0               | 0                | 0   | 0                     | 0                        | 0                | $\bigtriangleup$           | 0                             | 0                                | 0     | С        |
| Δ                | $\bigtriangleup$ | $\bigtriangleup$   | ×              | ×                  | ×           | Formalin                                  | 0               | 0                | 0   | 0                     | 0                        | 0                | $\triangle$                | 0                             | 0                                | 0     | С        |
| Δ                | ×                | 0                  | $\triangle$    | $\triangle$        | $\triangle$ | Sodium hypochlorite                       | 0               | 0                | 0   | 0                     | $\bigtriangleup$         | 0                | $\triangle$                | 0                             | 0                                | 0     | C        |
| Δ                | 0                | 0                  | 0              | ×                  | ×           | Ethanol for disinfection                  | 0               | 0                | 0   | 0                     | 0                        | 0                | ×                          | 0                             | $\triangle$                      | 0     | ×        |
| ×                | ×                | ×                  | 0              | ×                  | ×           | Welpas                                    | 0               | 0                | 0   | 0                     | 0                        | 0                | ×                          | 0                             | $\triangle$                      | 0     | ×        |
| $\bigtriangleup$ | 0                | 0                  | 0              | ×                  | ×           | Isopropanol                               | 0               | 0                | 0   | 0                     | 0                        | 0                | ×                          | 0                             | ×                                | 0     | ×        |
| ×                | ×                | ×                  | 0              | 0                  | ×           | Povidone iodine                           | 0               | $^{\circ}$       | 0   | 0                     | $^{\circ}$               | 0                | $\bigtriangleup$           | 0                             | 0                                | 0     | ×        |
| ×                | ×                | ×                  | 0              | 0                  | ×           | Prepodyne solution                        | $^{\circ}$      | 0                | 0   | 0                     | $^{\circ}$               | 0                | $\triangle$                | 0                             | 0                                | 0     | ×        |
| ×                | ×                | ×                  | 0              | ×                  | ×           | Rare tincture of iodine                   | $^{\circ}$      | $^{\circ}$       | $^{\circ}$                                  | 0                     | $^{\circ}$               | 0                | $\bigtriangleup$           | 0                             | 0                                | 0     | ×        |
| Δ                | $\bigtriangleup$ | $\triangle$        | $\triangle$    | ×                  | 0           | Phenol                                    | 0               | 0                | 0   | 0                     | 0                        | $\bigtriangleup$ | ×                          | $\triangle$                   | ×                                | ×     | ×        |
| Δ                | $\bigtriangleup$ | $\triangle$        | $\triangle$    | $\triangle$        | 0           | Saponated cresol solution                 | 0               | 0                | 0   | 0                     | 0                        | $\bigtriangleup$ | ×                          | $\triangle$                   | ×                                | ×     | ×        |
| 0                | 0                | 0                  | 0              | 0                  | ×           | Germitol                                  | $^{\circ}$      | $\triangle$      | $\triangle$                                 | 0                     | ×                        | $\triangle$      | ×                          | $\triangle$                   | ×                                | ×     | ×        |
| 0                | 0                | $^{\circ}$         | $^{\circ}$     | 0                  | ×           | Benzethonium chloride                     | 0               | $\bigtriangleup$ | $\triangle$                                 | 0                     | ×                        | $\bigtriangleup$ | ×                          |                               | ×                                | ×     | ×        |
| 0                | 0                | 0                  | 0              | ×                  | ×           | Maskin solution                           | 0               | $\triangle$      | $\triangle$                                 | 0                     | ×                        | $\triangle$      | ×                          |                               | ×                                | ×     | ×        |
| 0                | 0                | 0                  | 0              | 0                  | ×           | Alkyldiaminoethylglycine<br>hydrochloride | 0               | $\bigtriangleup$ | $\triangle$                                 | 0                     | $\bigtriangleup$         | $\triangle$      | ×                          |                               | ×                                | ×     | ×        |
|                  |                  |                    |                |                    |             |   |                 |                  | luded in<br>re, ∆: S                        |                       |                          |                  |                            |                               |                                  | ctive |          |

### Merits of ozone water decontamination

- (1) Because decomposition and disinfection are performed while washing with ozone water, far superior effect as compared to decontamination with water can be achieved.
- (2) Because ozone water is obtained from water and air, it need not be stored against emergency. There is no loss of ozone water as well. (3) There is no variation in the cost as a result of usage frequency. The cost remains the same whether ozone water is used once or several thousand times.
- (4) In the case of any disaster, the ozone water can be discharged as sewage after use.
- (Even in the case of a disaster, as the contaminated water is broken down due to water decontamination, the cost and time required for post-processing is reduced to a great extent.)
- (5) Reliable decontamination can be performed by using the CT value while checking the concentration of the ozone water.
- (6) If the equipment is available, it can be taken to the workplace and used for all types of processing.

\* The above values have been calculated based on the data of America CDC and the Ministry of Health, Labor, and Welfare

determined after checking the ozone water concentration, while aiming at the CT value.

(7) Action can be taken even if the disinfection object is not clearly known.

### Ozone water decontamination standard

consideration in the decontamination time.]

| Substance used          | CT value | 1 ppm<br>(mg/l) | 1.5 ppm        | 2 ppm          | 2.5 ppm        | 4 ppm           | Death rate |
|-------------------------|----------|-----------------|----------------|----------------|----------------|-----------------|------------|
| Anthrax                 | 6 to 10  | 6 to 10 min.    | 4 to 6.6 min.  | 3 to 5 min.    | 2.4 to 4 min.  | 1.5 to 2.5 min. | 99.9%      |
| Colon bacterium         | 0.6 to 1 | 36 to 60 secs.  | 24 to 40 secs. | 18 to 30 secs. | 14 to 24 secs. | 9 to 15 secs.   | 100%       |
| Staphylococcal bacteria | 0.6 to 1 | 36 to 60 secs.  | 24 to 40 secs. | 18 to 30 secs. | 14 to 24 secs. | 9 to 15 secs.   | 100%       |
| Influenza virus         | 0.6 to 1 | 36 to 60 secs.  | 24 to 40 secs. | 18 to 30 secs. | 14 to 24 secs. | 9 to 15 secs.   | 100%       |
| Bacillus pestis         | 0.6 to 1 | 36 to 60 secs.  | 24 to 40 secs. | 18 to 30 secs. | 14 to 24 secs. | 9 to 15 secs.   | 100%       |
| Smallpox virus          | 0.6 to 1 | 36 to 60 secs.  | 24 to 40 secs. | 18 to 30 secs. | 14 to 24 secs. | 9 to 15 secs.   | 100%       |
| Hydrogen sulfide        | 1        | 60 secs.        | 40 secs.       | 30 secs.       | 24 secs.       | 15 secs.        |            |
| VX gas                  | 10       | 10 min.         | 6.6 min.       | 5 min.         | 4 min.         | 25 min.         |            |
| Sarin                   | 10       | 10 min.         | 6.6 min.       | 5 min.         | 4 min.         | 25 min.         |            |

\* As regards the biological agents (because the bacteria and viruses cannot be measured), contact with the ozone water must be for more than the seconds and minutes

\* Because the CT value and the decontamination time vary depending on the concentration of the disinfection object and the environment, these values are to be considered only as usage standards, and decontamination must be performed while checking a meter such as a counter. (As regards VX and sarin, some clearance is taken into

30 m<sup>3</sup>

The processing time (attainment time) of CT value 60 differs depending on the environment (dirt, air-tightness, atmospheric temperature, and humidity)

\* The recommended space for the use of BT-082 is a 30 m3 space that is highly air tight.

30 minutes

Total evaluation

| * The data on bacillus tuberculosis is based on information provided by the Research Institute of Tuberculosis, |
|---|
| Japan Anti-Tuberculosis Association   |

|   |   |  | Effect of disin                 | fection of bacter              | ia by low-conc                            | entration o       | ozone gas                           | Ozone gas bactericidal data  |                        |                      |                                    |                    |                                     |  |                             |                                    |   |  |
|---|---|--|---------------------------------|--------------------------------|---|-------------------|-------------------------------------|--|------------------------|----------------------|------------------------------------|--------------------|-------------------------------------|--|-----------------------------|------------------------------------|---|--|
| Dzone Gas Data  |   |  | Bacteria strain                 | No. of unprocessed<br>bacteria | No. of bacteria after<br>ozone processing | Bactericidal effe | ct Ozone processing<br>conditions   | Virus / bacteria   | Bactericidal<br>method | CT value (ppm x min) | Death rate<br>(reduction rate) (%) | Virus / bacteria   |                                     | Bactericidal<br>method   | CT value (ppm x min)        | Death rate<br>(reduction rate) (%) | * Verification Institutions<br>(1), (2) Laboratory of Microbiology        | Channes Officerers and stated their series |
| Dzone das Data  |   |  | Colon bacterium                 | 1 x 10 <sup>4</sup>            | 72  | 99.99             | Ozone                               | (1) E Colon bacterium  | Gas                    | 60                   | 99.99                              | (6) Norevirus      |                                     | Gas  | 72                          | 100                                | <ol> <li>(4) Department of Viral Infection, F</li> </ol>                  |  |
|   |   |  | Staphylococcus aureus           |                                |   |                   | concentration:                      | (2) Staphylococcus pyogenes<br>(streptococcal bacteria)  | Gas                    | 60                   | 100                                | (7) Bacillus cereu | IFO13494                            | Gas  | 24                          | 100                                | (5) The Ministry of Health, Labour  | nd Welfare and the Fire Depart             |
| as Decontamination Technology   | used in personal portable pre                       | oicion oquinmont   | N20                             | 5 x 10 <sup>4</sup>            | 57  | 99.98             | 1 ppm                               | (3) . Staphylococcus aureusIFO 12732<br>(streptococcal bacteria)   | Gas                    | 24                   | 100                                | (8) Vibio Parahae  | olyticus IFO12711                   | Gas  | 24                          | 100                                | (6) Visionbio Corporation   |  |
| unhialan  | and inside a shelter                                | cosion equipment,  | Staphylococcus aureus<br>RN2677 | 5 x 10 <sup>4</sup>            | 45  | 99.99             | Processing                          | (4) New influenza (H1N1)   | Gas                    | 18                   | 99.7                               | (9) Salmonella ty  | nimuriun IFO14193                   | Gas  | 24                          | 100                                | (3), (7), (8) Japan Food Research La<br>(9) Okavama Industrial Technology |  |
| -eatures of gas decontamination   | ,   |  | Streptocoocus pyogene           | 15 3 x 10 <sup>6</sup>         | 0   | 100               | time:<br>60 minutes                 | (5) New influenza (H5N1)   | Gas                    | 60                   | 100                                | (10) Hydrogen sulf | le                                  | Gas  | 28                          | 100                                | (9) Okayama industrial recrinology<br>(10) Test results provided by Waka  |  |
| Can be applied to non-heat resistant<br>and non-water resistant equipment |   | See data provided by Laboratory of Microbiology, Showa Pharmaceutical University |                                 |                                |   |                   | Ozone gas decontamination standards |  |                        |                      |                                    |                    | [Standards for chemical substances] |  |                             |                                    |   |  |
|   |   | S SAM  |                                 | .,,,                           |   |                   | ,                                   | [Standards for various viruses and bact  | eria]                  |                      |                                    |                    | Hvdrogen s                          | ulfide aas 90°   | % or higher deco            | ontamination sta                   | andard CT value   | 30   |
| - Has excellent permeability and diffusibility                            |   |  |                                 |                                |   |                   |                                     | Colon bacterium, staphylococcus aureus (MRSA), pseudomonas aeruginosa,<br>influenza virus, pests, bacillus tularensis, coccidioidomycosis, ebola, and smallpox virus |                        |                      |                                    |                    |                                     | Hydrogen sulfide gas 99% or higher decontamination standard CT value<br>Chlorine gas 90% or higher decontamination standard CT value |                             |                                    |   |  |
| - Bacterial resistance does not occur                                     |   |  |                                 |                                |   |                   |                                     | 90% or higher decontamina  | -                      |                      |                                    | 25                 |                                     |  | •                           |                                    |   | 30   |
| Comparison of gas decontamination met                                     | thods   |  |                                 |                                | No  | of bacteria det   | octod on                            | 99% or higher decontamina  |                        |                      |                                    | 50                 |                                     |  | •                           | mination standa                    |   | 60   |
| Item Hydrogen peroxide Ozone Eth  | hvlene oxide Formaldehvde                           | Chlorine dioxide   | Experiment                      | Spraying amount of             | a 7H 10 ag                                | ar monotonous     | s culture medium                    |  |                        |                      |                                    |                    |                                     |  | •                           | ination standard                   |   | 75   |
| Decontaminating property  | 0 0   | 0  | category E                      | BCG Tokyo strain and tir       | le Ozo                                    | ne Pos            | sitive control group                | 99.9% or higher decontamina  | ition stan             | dard CT value        |                                    | 60                 | Amm                                 | onia 99% or h  | iigher decontam             | ination standard                   | l CT value  | 150  |
| entermana ca apirul suor basing backhun)                                  |   | 0  | 1 4                             | .2 x 102 cfu/mi                | n 0                                       |                   | 41                                  | (Note) The ambient humidity in the decontamination   | room is desired t      | o be 60% or more.    |                                    |                    | (Note) The ambient                  | numidity in the deco   | ntamination room is de:     | sired to be between 60%            | 6 and 80%.  |  |
| Decontaminaling property (performance against chemicals)                  | Δ Ο   | 0  | 2 2.1                           | 1 x 102 cfu/30 :               | ec. 0                                     |                   | 22                                  | [Standards for spore bearing bacterium   | (anthrax)]             |                      |                                    |                    | [Processing tim                     | e standard for   | a decontaminatio            | n CT value of 60]                  |   |  |
| Effect on equipment   | 0 0   | ×  | 3 4                             | .2 x 101 cfu/mi                | n 0                                       |                   | 2                                   | 90% or higher decontamina  | tion stand             | ard CT value         |                                    | 100                | Starting from a zero o              | cone concentration wh  | nen BT-082 is used in a clo | sed space (humidity 60%            | or more and atmospheric temp  | erature 20°C)                              |
| Effect on human beings  | ×   | Δ  | 4 2.1                           | 1 x 101 cfu/30 :               | ec. 0                                     |                   | 0                                   | 99% or higher decontamina  | tion stand             | ard CT value         |                                    | 150                | ] [                                 | 1  | 0 m <sup>3</sup>            |                                    | 10  | minutes                                    |
| Safe processing   | (carcinogenicity)                                   |  | 5 4                             | .2 x 100 cfu/mi                | 1 O                                       |                   | 0                                   | 99% or higher decontamina  | tion stand             | ard CT value         |                                    | 200                | 1 [                                 | 2  | 0 m <sup>3</sup>            |                                    | 20  | minutes                                    |
| (average limit)   | essive processing time) (excessive processing time) |  |                                 |                                |   |                   |                                     |  |                        |                      | 1                                  |                    |                                     |  | • •                         |                                    |   |  |

(Note) The ambient humidity in the decontamination room is desired to be 80% or more.

\* The CT value standard is determined based on the CT value test performed by Showa Pharmaceutical University, Kyoto University (Japan Ozone Association),

Sanyu Bookstore, Kitasato University, Japan Food Research Laboratories, and American Guideline CDC (Tokyo Healthcare University).