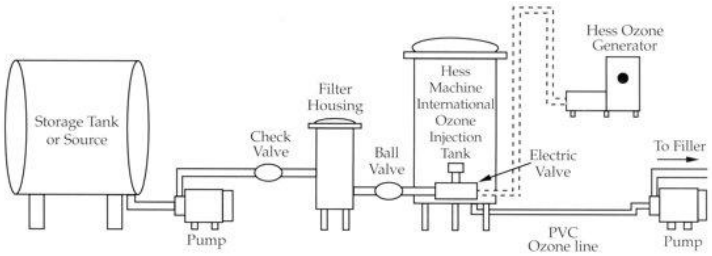
Hess Machine International Ozone Generator	
Mfg: Hess Machine International	**Model: H-50**
Stock No. 47a.GR296.	**Serial No. 127587-R**

Hess Machine International Ozone Generator. Model: H-50. S/N: 127587-R. Type: CS. Form: KHH. Capacity: 30 gpm / 1,800 gph. Ozone yield: 0.5 lbs/day. Maximum air flow: 0.5 scfm / 30 scfh. Air pressure into dryer: 80 psi. Air pressure out of dryer: 13 psi. Cooling water supply: 5 gph. Power supply: 110/220 V, 10 amps, 60/50 Hz, single phase. Thomas Compressor and Vacuum Pump, 3/4 hp, 1725 rpm, 115/230 V, 10.6/5.3 amps, 60 Hz, single phase. Overall dimensions: 3ft. 1in. L x ft. 3-1/2 in. W x 3ft. 8in. H.


M-692-B

Ozone Sterilization System, Hess Machine Company, Ephrata-PA, Model H-50, S/N I27587-R, with self contained air compressor 3/4 hp 115/230 volts 1,725 rpm, 115 volts transformer.



Display of a sample installation.

Ozonation is one of the many methods used for the disinfection of water. It is a technology substantially more effective than others.
Ozone has been used to treat ground and surface water in many European cities for years, with Paris, France opening its first ozone treatment plant in 1906. Now, there are more than 2,000 municipal water treatment plants worldwide using ozone. Ozone is also becoming the industry standard for disinfecting bottled water.

Ozone, also referred to as triatomic oxygen, is an unstable gas having life in water of minutes. Oxygen, which is normally bi-atomic, becomes ozone through the addition of a third unstable atom. Ozone, because of its instability, cannot be generated and stored for future use. It must be generated and used for treatment immediately. It is created by one of two-generation methods: Ultraviolet radiation or corona discharge. Of the two, corona discharge produces the substantially higher ozone concentration needed for the removal of complex impurities. Generated ozone is pumped into the water through a stone of fine porosity, creating very small bubbles, which rise slowly through the water. The slower the bubbles raise through the water, the greater the amount of ozone transferred to the water. Most critically for water quality, ozonation does not add chemicals to the water as does chlorine, chlorine dioxide, permanganate, etc. As the ozone passes through the water, the third unstable atom detaches, attacks, and destroys impurities in the water. The residue in the water is pure oxygen, which quickly dissipates in a few minutes. Any excess dissolved ozone which is not needed for treatment, reverts to simple oxygen in approximately 20-30 minutes.

Flow Rates			
Gallons Per Minute	30	Liters Per Minute	114
Gallons Per Hour	1,800	Liters Per Hour	6,813
Gallons Per 8 Hours	14,400	Liters Per 8 Hours	54,504
Gallons Per 24 Hours	43,200	Liters Per 24 Hours	163,512

Ozone Yield			
lbs./day	0.5	g/hour	9.5

Dimensions			
Generator Width	16"	Shipping Width	24"
Generator Length	37"	Shipping Length	42"
Generator Height	45"	Shipping Height	50"
Generator Weight	210 lbs.	Shipping Weight	360 lbs.

Electric	
Volts	110/220
Cycle (Hz.)	60/50
Current (amp.)	10
Phase	1
Plug-in Electrical Cord	Yes
Electrical Fused Disconnect	No
High Current Breaker (amp.)	5
High Voltage Transformer (kVA)	.5

Air	
Maximum Air Flow (SCFM)	0.5
Maximum Air Flow (SCFH)	30
Air Pressure Into Dryer (psi)	80
Air Pressure Out Of Dryer (psi)	13
Oil-Free Air Compressor (hp)	0.5
Oil-Free Air Compressor (volts)	110/220
Desiccant Cell Size (in.)	6"
Moisture Indicator	Yes

Cooling Water	
Required Flow (gph)	5

*All flow rates are dependent on the characteristics of the source water.

**Generators fed with oxygen double the pounds per day and gpm numbers expressed.

The primary effects of ozonation of drinking water are:
1. Bacterial disinfection and viral inactivation.
2. Oxidation of inorganics such as iron, manganese, organically bound heavy metals, cyanides, sulfides and nitrates.
3. Oxidation of organics such as detergents, pesticides, herbicides, phenols, taste and odor caused by impurities.
The action of ozone in each of these cases follows:

. . . Disinfection and Viral Inactivation

The extent of bacteria destruction and viral inactivation is related to the concentration of ozone in the water and its contact time with the microorganisms. Bacteria are the most rapidly destroyed. E-Coli bacteria are destroyed by ozone concentrations of just over .01 mg/liter and contact time of 15 second at temperatures of 25 degrees C (77 degrees F) and 30 degrees C (86 degrees F). * Streptococcus fecalis are much more easily destroyed. At ozone concentrations of about 0.025 mg/liter, 99.99% inactivation is obtained in 20 seconds or less at both temperatures. Viruses are more resistant than bacteria. Poliovirus types I, II and III are inactivated by exposure to concentrations of dissolved ozone of 0.4 mg/liter over a four minute contact period.

. . . Oxidation of Inorganics

In the case of iron, manganese and the several arsenite or arsenate compounds, oxidation takes place very rapidly, leaving insoluble compounds, which are easily removed by an activated carbon filter. Sulfide ions are oxidized sequentially to sulfate ions, an innocuous substance. The first stage of this oxidation is very rapid, quickly and efficiently removing any sulfurous odors. Nitrite ions are oxidized to nitrate ions, which are stable and innocuous.

. . . Oxidation of Organics

Ozone if a very powerful agent in treating organic materials. Organics are either natural (humic and fulvic acids) or synthetic (detergents, pesticides) in nature. Some organics react with ozone very rapidly to destruction, within minutes or even seconds (phenol, formic acid), whereas other react more slowly with ozone (humic, fulvic acids, several pesticides, trichloroethane, etc.) In some cases, organic materials are only partially oxidized with ozone. A major advantage of partial oxidation of organic materials is that in becoming partially oxidized, the organic materials become much more polar than originally, producing complex insoluble materials which are removed by activated carbon filters.