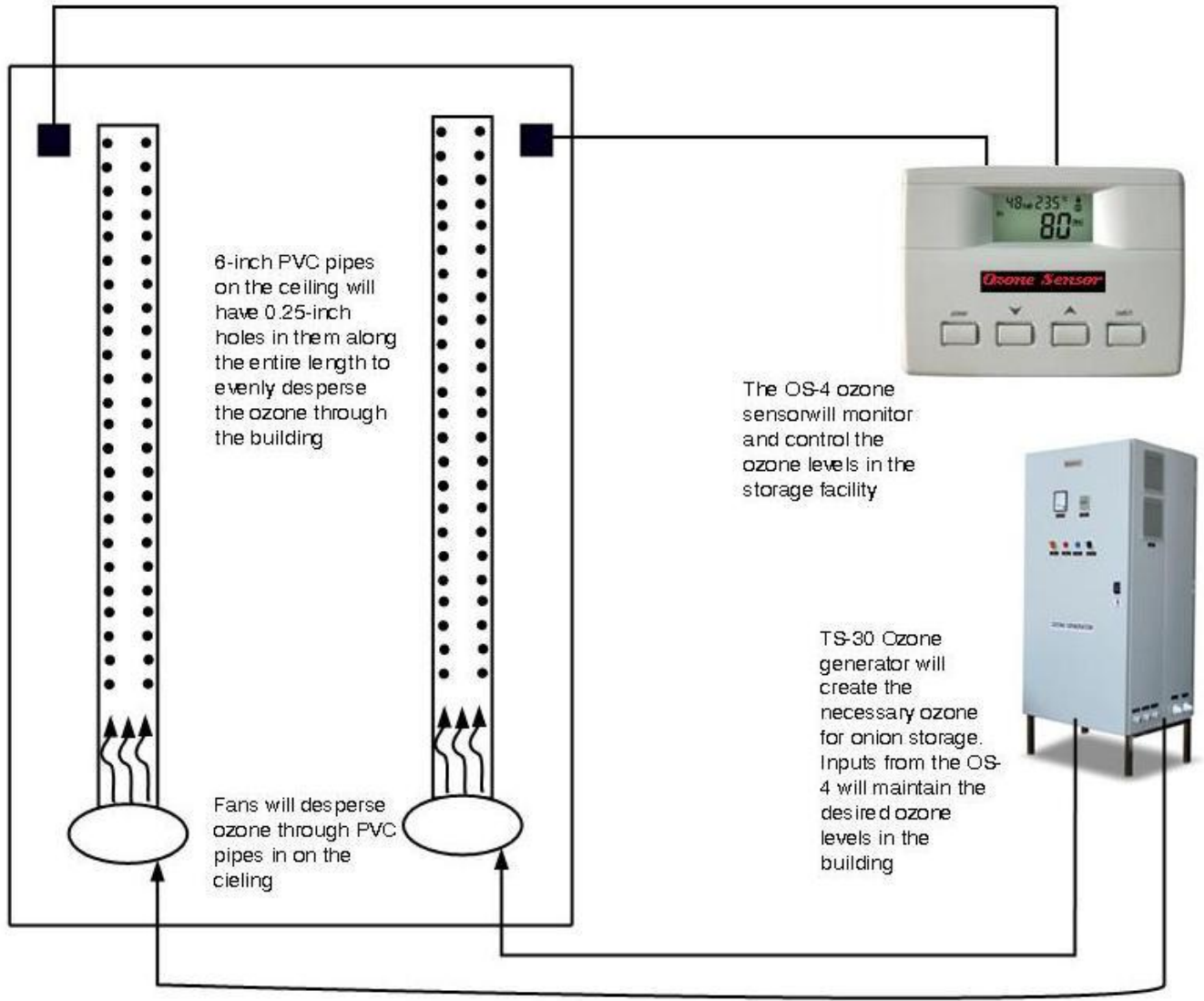


Ozone in Warehouse & Cold Storage

System Diagram



The above diagram shows how a [food storage ozone system](#) works. [Click image to enlarge.](#)

Benefits of Ozone Use in Cold Storage

- Extend shelf-life of the produce within the cold storage facility.
- Air-borne microbiological control
 - Low ozone levels (<0.3 PPM) will inhibit microbiological growth in the air.
 - High ozone levels can be used for disinfection when room is empty.
- Surface sanitation can be maintained
 - By inhibiting microbiological growth pathogens on the surface of produce, containers, and walls will be kept to a minimum.
- Eliminate mold growth from cold storage area.
- Odor control
 - Maintain an odor-free cold storage area
 - Keep odors from cross contaminating between products
- Ethylene Removal



A Cold Storage Food Warehouse

Extension of Storage Life With Ozone

Ozone has been demonstrated to improve the shelf-life of many foods.

Food	Extension	Storage Conditions
Fish	50-80%	ozone sterilized ice
Salmon	50%	ozone sterilized ice
Jack Mackerel and Shimaaji (fish)	1.2 - 1.6 days	Soak in 30% NaCl cont. 0.6 mg/L O ₃ 30-60 min. every 2 days.
Beef (frozen)	30-40%	0.4°C; 85-90% RH; 10-20 mg/m ³ O ₃ , provided original microbial count is below 10 ³ /cm ²
Poultry	2.4 days	Soak in ice water while passing in O ₃ (3.88 mg/L) 20 min.
Bananas	substantial	A few ppm O ₃ @ 12°C, if fruit is not within a few days of its period of rapid ripening.
Strawberries, Raspberries, Currents, Grapes	100%	2-3 ppm O ₃ , continuously or several hours each day.
Apples	several	1.95 cm ³ O ₃ /m ³
Potatoes	6 months	3 mg/L O ₃ ; 6-14°C; 93-97% RH
Eggs	8 months	0.6 ppm O ₃ ; 31°F; 90% RH
Cheeses	63 days	0.2 - 0.3 ppm O ₃

* Source: Review of the Applications of Ozone for Increasing Storage Times of Perishable Foods, Ozone: Science and Engineering, Vol. 4, pp. 147-163, 1982, Pergamon Press Ltd.

Ozone is Allowed for Direct Contact with Food

- **August 13, 1999** - FDA issues 21CFR Part 173.368 giving ozone GRAS approval for use on all meat and poultry products.
- **December 23, 1999** - FSIS published final rule approving the use of ozone in meat and poultry products.
- **December 17, 2002** - USDA issues FSIS Directive 7120.1 naming ozone a Safe and Suitable Ingredient Used in the Production of Meat and Poultry Products

Ozone is Approved for Use with Food.

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