



**PRO 360, 36R, 620, & 62R,  
CA 15, & 15R SERIES  
Commercial  
Ozone generator  
Maintenance Manual**



# **SPECIFICATIONS FOR** **PRO 360, 36R, 620, 62R, CA 15 & 15R**

| <u>Model</u>             | <u>CA 15</u><br><u>PRO 360</u>                       | <u>CA 15R</u><br><u>/PRO 36R</u> | <u>PRO 620</u>                     | <u>PRO 62R</u>                  |
|--------------------------|--|----------------------------------|------------------------------------|---------------------------------|
| <b>Maximum output</b>    | 72/180/360<br>g/hr                                   | Up to 360 mg.<br>Fully variable  | 620 mg/hr                          | Up to 360 mg.<br>Fully variable |
| <b>fan size</b>          | CA: 21   |                                  | PRO: 34 cfm                        |                                 |
| <b>Construction</b>      | CA: Stainless Steel                                  |                                  | PRO: PVC W stainless inner chassis |                                 |
| <b>Weight</b>            | 5 lb   |                                  |                                    |                                 |
| <b>Size</b>              | CA: 4"x5"x7"   |                                  | PRO: 10"x4"x4"                     |                                 |
| <b>Generation Method</b> | Corona Discharge                                     |                                  |                                    |                                 |
| <b>Power Usage</b>       | 120 volt version 25 watt or 240 volt version 25 watt |                                  |                                    |                                 |

## **PRO 360, 36R, 620, 62R, CA 15 & 15R** **Ozone generator Owners Manual**

**CAUTION: READ INSTRUCTIONS THOROUGHLY BEFORE OPERATION OF UNIT**  
(This ozone generator operates at 4200 volts)

**HOW OZONE WORKS:**

Crystalair ozone generators use ozone to deodorize the air the same way nature uses lightning to create ozone to clean the air naturally. Ozone is very unstable and attaches to pollutants, odors, etc. and oxidizes them. This reaction of ozone leaves an area with fresh clean air.

**CAUTION: DO NOT PLUG UNIT IN WITH LID OFF**

1. Read complete instructions before using ozone generator
2. Open cabinet by following step 1 of the cleaning instructions. Check to make sure the generator plate has not moved out of place. Once this has been checked the cabinet lid may be reinstalled and the unit is ready for use.

**PLACEMENT AND SETTING OF MACHINE:**

1. (Placement) The CA 15, 15R, PRO 360, & 36R counter top models have been designed for room deodorization. This unit should be placed in an area where the best ozone distribution is obtained. A small household fan will greatly aid in distributing the ozone evenly. The ozone generator should also be kept away from very dirty or dusty areas like the floor.
2. (Setting Ozone Level) The right level is when all the generated ozone is being used up accomplishing its job. However, this is difficult to obtain because it becomes a balancing act. Initially the machines output is set high for a short time to get rid of the problem odor as quickly as possible. As this is being accomplished less ozone is required for the diminishing odors, thereby leaving some residual ozone in the air. If the machines output is not turned down after awhile then more residual ozone will be in the air. If there is a heavy smell of ozone, then there is more ozone present than is required to do the job. Simply turn the rheostat (output level control if supplied with one otherwise Refer to the next page) down. This is a case where more is not considered better. The levels of ozone required to clean most environments are from .03 ppm to .1 ppm.
  - The CA 15 & PRO 360 produce 360 mg of ozone per hour and may be reduced to 180 or 72 mg/hr by simply changing the stainless steel generator screen originally mounted in the machine for the smaller one supplied in the package(180 mg/hr). If by chance the smaller screen is not small enough, you may remove the screen under the mica (180 mg/hr) or one of the top generator screen may be cut down to any size smaller than they were originally supplied at.
  - The ozone output on the CA 15R, PRO 36R & 62R can be turned down by simply turning the rheostat control knob.
  - The PRO

**CAUTION: Do not substitute this stainless steel mesh, generator screens with any other screen larger than the one supplied with your unit. A larger generator screen will result in definite damage and most likely BURN OUT UNIT.**

## MAINTENANCE:

NOTE: Do not attempt to lubricate any parts of the generator. Failure to comply may result in severe damage to the unit.

Under heavy duty use or severely polluted areas, your CRYSTALAIR ozone generator should be inspected every 2 to 3 weeks for fine dust or oily residue collecting on generator surfaces or plates. Light duty use requires cleaning every 2 weeks to 6 months depending on severity of pollution and humidity.

**NOTE:** If a fine dust or oily residue appears, it is time to follow the recommended cleaning procedures.

## OZONE GENERATOR PLATE CLEANING INSTRUCTIONS

### (WARNING: HIGH VOLTAGE)

Ensure that power supply is disconnected before starting any maintenance procedure or electrical shock injury may result.

CLEANING PROCEDURE: CA 15, 15R      CLEANING PROCEDURE: PRO 360, 36R

1. Remove the eight cabinet screws (four on each side) and lift the lid off the chassis. (SEE FIG.1)

1. Remove the three cabinet screws (two on top one on the bottom) and slide the inner tray out from the rear of the unit. (SEE FIG.1a)

Proceed to step 2



FIGURE 1



FIGURE 1A

2. Locate and remove the screw from high voltage plate holding clip, then remove holding clip (SEE FIG. 2)

3. Use the edge of the holding clip to gently lift up and remove the stainless steel screen and mica (SEE FIG 2).

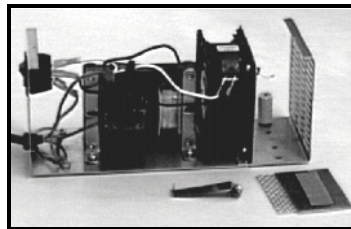


Figure 2

4. Place the mica sheet totally flat on bottom of the tray and with a toothbrush, water, and dish soap gently scrub both sides of mica to remove all oxidized material from the surface (SEE FIG. 3). Repeat procedure on stainless steel screen then rinse all parts in clean water.

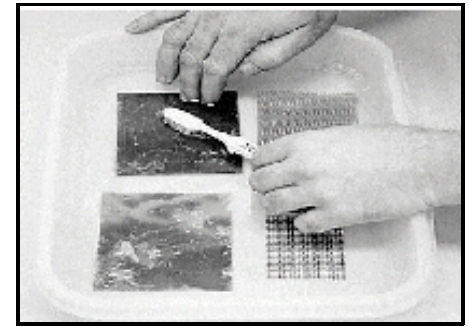


Figure 3

5. Once mica and stainless steel have been cleaned place plate assembly on the middle oven rack at approx. 100 to 150 F. for ½ to 1 hour to ensure plates are completely dry. Once dried, mica plate must be inspected. Hold plate up to a light to ensure no arc holes have developed or that any other damage is present (SEE FIG. 4 & 5).

(WARNING: All components must be 100% dry before use or damage to generator will result)

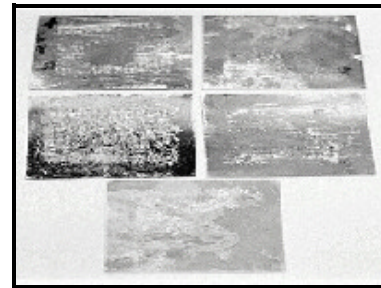


Figure 4

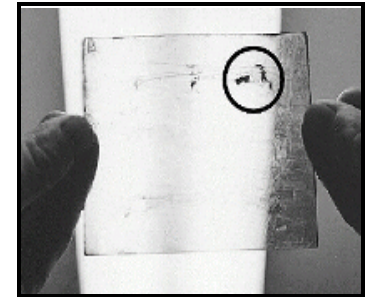


Figure 5

### REPLACING SERVICED PLATE IN MACHINE:

6. Install plate in reverse order of removal being careful stainless steel screen remains centered at all times.

(Be very careful not to scratch mica plates)

7. Once plate has been installed, on the PRO 360, 36R, reinstall tray into cabinet tube and replace external screws, on the CA 15, 15 R replace lid and lid screws, then plug in and test unit for proper operation.

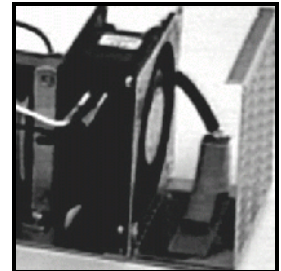


Figure 6

## TROUBLE SHOOTING:

# Questions and Answers About Ozone

1. Fan works but no ozone:

A: Are the plates clean ? (refer to maintenance section) if unit does not work after cleaning it will probably need to be sent in for service work.

2. No fan or ozone:

A: Check fuse. If fuse is blown replace with fuse of same value.

B: If new fuse blows make sure plates are clean. If plates are clean and fuse still blows unit will need to be sent in for servicing.

3. Unit snaps or sparks:

A: Are the plates clean ? (refer to maintenance)

B: Is the center screen in the plate centered ? (If screen is off center place back in center of plate. Refer to maintenance instructions for plate removal and replacement).

C: If unit makes a snapping or popping sound, moisture may be present in generator plate (remove and bake for one hour at 150 F.). Ensure upon reinstallation that stainless steel is centered as close as possible and that all other components of ozone generator are clean dry and damage free.

CAUTION:(Be very careful not to scratch mica plates). If snapping or sparking still occurs or the unit does not produce ozone then it will have to be sent in for service.

## WARRANTY

The PRO 360 is warranted against defects in materials and workmanship for a period of four year from date of purchase. Liability is limited to parts and labor only. Shipping is the sole responsibility of the customer. CRYSTALAIR is not liable for damage caused by shipping, misuse, neglect or lack of regular maintenance.

### **QUESTION: WHAT IS OZONE?**

**ANSWER:** Ozone is sometimes called "activated oxygen" . It contains three atoms of oxygen rather than the two atoms we normally breath. Ozone is the second most powerful sterilant in the world and its function is to destroy contaminants and odors. Interestingly ozone occurs quite readily in nature, most often as a result of lightning strikes that occur during thunderstorms. In fact that, "fresh, clean, spring rain " smell that we notice after a storm most often results from natures creation of ozone. Ozone is also created by water falls. However, we are probably most familiar with ozone from reading about the "ozone layer" that circles the planet above the earth atmosphere. Here ozone is created by the sun's ultra-violet rays. This serves to protect us from the ultra-violet radiation. Additionally, each of us is exposed to high levels of ozone daily for short periods of time. This happens in heavy traffic conditions or during times when the weather forces the industrial gases to remain lower to the ground than is otherwise normal. The combination of these two factors can result in ozone readings as high as 4 or 5+ times the "regulatory" levels for continuous exposure with absolutely no adverse effects as our exposure is for such short periods, and the ozone itself decays back to normal oxygen so rapidly.

### **QUESTION: HOW DOES OZONE WORK?**

**ANSWER:** While ozone is very powerful, it has a very short life cycle. When it is faced with odors, contamination, etc. the extra atom of oxygen destroys them completely by oxidation. In so doing, that extra atom of oxygen is destroyed and there is nothing left...no odor...no contamination...no extra atom, only oxygen. In addition to the effectiveness of ozone, we also know that it is safe to use. We know this from our own safe exposures daily to ozone, weather, as noted earlier, resulting from being locked in traffic, or passing through industrial areas. These exposures have no effect on us beyond our acknowledging the unpleasant odor associated with this "filthy air". It is the very unpleasantness of this air that provides ozone with it's "built in" safety mechanism. Ozone is safe because we notice it's unpleasant odor at very low residual levels. By residual we mean, the amount of ozone that is produced in excess of the required amount to kill whatever contamination or odor that may be present in the room. Even if installed incorrectly, ozone provides its own protection, as ozone warns us in a manner similar to smoke in a room. Ozone does this by becoming so offensive at 1.5 parts per million that we would not be able to stay in the environment for any more than a short period. This is much like what would happen if we entered a smoke filled room. However, while smoke might harm us, research has proven that such a limited exposure to such a low level of ozone would have no serious long term affect on us just as it does not affect us when caught in a traffic jam during rush hour.

### **QUESTION: HOW IS OZONE PRODUCED?**

**ANSWER:** There are basically two methods of producing ozone...ultra-violet and corona discharge. Most equipment uses the corona discharge method, simulating in essence, lightning. Corona discharge ozone generators are fully adjustable Equipment utilizing UV is not very popular because it is inefficient, unreliable, unadjustable, and very costly to service compared to the modern corona discharge equipment now available.

### **QUESTION: HOW LONG DOES THE OZONE LAST?**

**ANSWER:** As soon as ozone is formed in the generator and dispersed in a room it begins to decay back into oxygen. This step occurs by several processes including the following: Natural decay (or revision to oxygen) due to ozone chemical instability. Speeding up of the above process by the presence of such things as walls, carpets etc. stimulating the decay process. Oxidation reaction with odor causing organic material, which removes ozone. Reactions with contamination etc., which again consumes ozone by oxidation reactions. Additionally ozone itself has a half life which means that half of the "residual" ozone created (extra unneeded ozone) will return to oxygen within at most 30 minutes. What this means is that after each subsequent 30 minute period there would be half as much residual ozone left at the end of the period as was present at the beginning of the period. This is similar to a geometric progression of 16;8;4;2;1. In practice the half life is usually less than 30 minutes due to contaminants in the air. Therefore, ozone while very powerful doesn't last long...just does it's job and disappears.

**QUESTION: WILL THE ODOR COME BACK?**

**ANSWER:** Not if the ozone is used properly. Ozone destroys the source of odor. However, in the case of mildew the odor will return if you are unable to get rid of the moisture that is the source of the mildew. Also if the odor began as a substance such as urine, facies, rotting food, etc. it is essential to remove the substance and then treat with a liquid deodorizer like C20 before ozonating when possible. If it is not possible to remove the source substance like in the case of urine, treat heavily with C20 to ensure success.

**QUESTION: HOW DOES OZONE HANDLE TOBACCO SMOKE?**

**ANSWER:** Ozone works very efficiently at deodorizing tobacco smoke. It also reduces the irritation caused by phenol gasses, by oxidizing them. Phenol gasses are the invisible part of tobacco smoke that causes such discomfort to one's eyes and helps create the offensive odors.

**QUESTION: WHAT IS THE RIGHT LEVEL OF OZONE?**

**ANSWER:** The right level is when all the generated ozone is being used up accomplishing its job. However, this is difficult to obtain because it becomes a balancing act. Initially the machine's output is set higher to get rid of the problem odor as quickly as possible. As this is being accomplished less ozone is required for the diminishing odor, contamination, etc., thereby leaving some residual ozone in the air. If the machine output is not turned down after awhile then more residual ozone will be in the air. If there is a heavy smell of ozone, then there is more ozone present than is required to do the job. Simply turn the rheostat (output level control) down. This is a case where more is not considered better.

**QUESTION: IS OZONE HARMFUL AND WHAT IF ANY ARE THE LONG TERM EFFECTS?**

**ANSWER:** Ozone has been known for almost a century now, so quite a lot is known about it. Several regulatory agencies, including OSHA - Occupational safety and health agency in USA, and WCBC Occupational safety and health agency in Canada, have stipulated that the maximum safe allowable level of residual ozone is 0.08 ppm based upon the historical safety of ozone. Note that this permissible level is for continuous exposure throughout an entire 8 hour day for 5 days a week. If anyone is exposed to that concentration of ozone, it is usually as the by product of an industrial process like arc-welding. The temporary affects of such a low exposure would range from headaches, to sore throats, irritation in the eyes, nose and the like, similar again to what we would experience in a traffic jam.

**QUESTION: HOW CAN YOU TELL THE LEVEL OF OZONE?**

**ANSWER:** There are a number of mechanical methods available, the most common and effective being the monitors and controllers that use a heated metal oxide sensor(HMOS). These HMOS monitors and controllers only have a 20-30% accuracy, if a higher degree accuracy is required then a high quality photometer is required. A wide range of HMOS and photometers for various applications are available at your local Crystal Air supplier. Residual ozone becomes apparent to sensitive humans in the range of .01 - .03 ppm. or well below the permissible levels for continuous exposure. As noted previously, this residual ozone is extra ozone that is not required to reduce contamination etc.

**Note:** It is recommended that a controller be used for all installations in occupied areas.

**QUESTION: WHAT ARE THE APPLICABLE REGULATIONS REGARDING OZONE?**

**ANSWER:** In Canada the Worker's Compensation Board of B.C. guidelines stipulate that continuous exposure 8 hours a day for 5 days per week in an environment containing maximum level of 0.08 ppm. of ozone is safe. The normal concentrations that are used for deodorizing in occupied areas are in the range of .01 - .03 ppm., well within the guidelines.

**IMPORTANT NOTE ON OZONE**

It is not necessary that you smell the sweet odor of ozone (similar to fresh country air following a thunderstorm) for it to be effective. Even roses are an objectionable odor to some people, when in excess.

1. **TO SET OZONE:** Set ozone to a setting where you can barely detect ozone after an hour of operation.
2. If ozone is still detected, reduce ozone setting, if the disagreeable odor is still prevalent, increase ozone setting a small amount. Properly adjusted, neither ozone or the objectionable odor should be detected.
3. levels of ozone required to deodorize most environments are from 0.03 ppm to 0.1 ppm.
- 4 **CIRCULATION:** Air circulation is an important factor in how effective ozone works. An oscillating fan should be placed next to generator for proper circulation.
5. **MOUNTING:** Generator should be mounted high in the room, 6 to 8 feet off the floor. Generator should be mounted above the door pointing away from sensitive areas.

## A BASIC GUIDE TO DEODORIZATION USING OZONE

**OZONE SHOCK TREATMENT PROCEDURE :**

**Suggested size: PRO-10,000 , PRO-5000 , PRO-3600-5**

The idea of an ozone shock treatment procedure is to eliminate the initial contamination from the air and then provide continuous control over recurring contamination by way of ozone. First we must assess the extent of the odor problem in order to determine the size of the Crystal Air ozone generator which would be required to sufficiently eliminate the problem odor in a reasonable period of time. Once we have chosen the ideal size of ozone generator for the particular treatment area, the ozone generator should be placed pointing in the direction of the problem area. Strong fans must be placed throughout the area being treated to provide good ozone distribution. Operate the ozone generator at it's highest capacity for as long as it takes to eliminate the odor problem. In most cases it takes only a few minutes to do a shock treatment. If it is a type of odor that is absorbed in furniture, walls and bedding, for example, cigarette smoke, takes only 30-120 minutes with the proper sized ozone generator. After the shock treatment procedure is complete, air out the room, if the odor is expected to continue place a Crystal Air ozone generator and monitor controller permanently in the area operating at a low level. Severe cases may require a 24 hour treatment. Milder cases may need a smaller unit or use lower output setting. NOTE# while performing a shock treatment, make sure that all people, pets, plants and other animals are vacant from the area to be treated. Also while using HIGH concentrations in a room, be sure that ozone does not leak into connected or occupied rooms by way of furnace vents or wall cracks etc.

**HOTEL ROOMS:**

**Suggested Size: PRO-3600 1, PRO 3400-1, CA 55-1, or CA 45-2**

These rooms can generally be deodorized in 30 to 40 minutes for cigarette or alcohol etc., by using a PRO-3600-1 or 2.

*House keeper should also wet/dry vacuum the contaminated areas, (ex. vomit, spilled milk, spilled beer)with a good detergent solution 24 hrs before deodorization procedure is performed.*

**GROCERY STORE STORAGE AREAS:**

**Suggested Size: PRO 3600-1, 3600-5 or PRO-5000 Depending on the size of the storage area**

To reduce odors and reduce cross contamination of foods to other foods, install a Crystal Air ozone generator in an out of the way place, with an additional fan to circulate the ozone efficiently throughout the entire area to be treated. Next install an ozone generator monitor controller in the center of the treated area to ensure the levels of ozone do not exceed the limits set by the Workers Compensation Board Of BC which are .08 ppm. averaged over an eight hour work period. The controller will cycle on and off as needed to maintain and control the ozone at the proper levels.

**OFFICES AND STORE FRONTS:**

**Suggested Size: PRO-360, CA-15, CA-55-1, 3400-1 Dependent on the size of room and contamination level.**

The same procedures are used here as in the smoking lounges with one exception, That usually there is no smoking in offices and store fronts, therefore a smaller ozone generator may be required.

**SMOKING LOUNGES:**

**Suggested Size: PRO-3600-1, PRO 3600-5, PRO 5000, PRO 10000.** Dependent on the size of room and contamination level.

The Crystal Air ozone generator should be properly sized for the specific area and number of possible smokers. The Ozone generator should be hooked into the air handling system in order to ensure proper distribution. ( Mounting brackets are available for the PRO 3600, 5000, & 10000). An ozone controller should also be used in order to ensure safe levels are not exceeded.

If a controller is not used adjust Crystal Air ozone generator so that can not detect the ozone or the problem odor. Begin with the ozone generator on low setting and work your way up slowly. One person at the establishment should be in charge of adjusting the ozone generator output as the number of smokers increase or decrease. If ozone is set for 40 smokers and 30 vacate, then the ozone generator should be adjusted to lower setting, otherwise the air will become excessively ozonated and possibly cause sore throat or headache.

**FURNITURE AND CLOTHING ARTICLES: PRO 3600-1, PRO 3600-5, PRO-5000.**

Make or utilize a room of proper size to accommodate all the articles to be deodorized. Place circulating fans in the room to vigorously blow the ozone around the room to penetrate the porous materials. If possible route fresh air into the ozone generator to reduce oxidation of the components. Place the items to be deodorized in the room and operate the ozone generator on full. This procedure may go on for 1-72 hrs depending on the circumstances.

**SMOKE DAMAGE CAUSED BY FIRE :**

**Suggested Size: PRO-10000, PRO-5000** Dependent on the size of room and contamination level.

In cases of small fire and smoke damage (e.g.: Grease Fire on stove, Severe toaster fire, fire place back through, mattress fire, electrical fire etc). With smoke fumes the premises should be thoroughly cleaned including the forced air furnace system before deodorization begins. Place a Crystal Air ozone generator on each level of the building accompanied with a good blower fan to force the ozone through the small pores of the walls, carpet, and furniture. This process may take up to 24-72 hours for adequate results to be achieved. Furniture and mattresses may need additional treatment by draping a sheet of plastic over them and placing an ozone generator underneath for approx. 1-2 hours.

**Note:** Odors created in a hot environment are embedded deeper in the pores of the materials such as curtains, furniture, wallboard etc. This is due to pores expanding when hot and closing when cold. A warm environment will always produce better results than a cold one when deodorizing a gaseous odor.

**MOLD AND MILDEW:**

**Suggested Size: PRO-10000, PRO-5000, PRO-360 CA-15 or CA-55-1**

Crystal Air ozone generators reduce or eliminate the ability for the exposed mold, mildew and fungus to grow. Mold and mildew grow in dark and humid places where there is a lack of oxygen. In all cases the moisture and humidity in the walls, floor etc., must be removed to effectively eliminate the problem. Once moisture is removed, all visible mold and mildew should be removed, then a shock treatment procedure can be performed lasting for 24-72 hrs. A small ozone generator can be used to help control continuous mildew problem odors.

**MUSTY BOOKS: Suggested Size: PRO-3600-1, PRO-3600-5**

Books must be placed in a room and be opened as wide as possible. Arrange Crystal Air ozone generator and fan to blow over the books. This process should take no more than one hour. Repeat if necessary.

**ANIMAL URINE:**

**Suggested Size: PRO-3600-1, PRO-3600-5, PRO 5000, PRO 10000** Dependent on the size of room to be treated.

Customer must locate and identify the area of the urine contamination if possible. Treat all contaminated surfaces with C20 liquid deodorizer. (*All liquid contaminants must first be treated with a liquid deodorizer*). Customer may have to pull up carpet, if present, in order to treat both sides of carpet. Also treat the porous concrete or wood beneath the carpet. Allow liquid deodorizer to dry completely, then place Crystal Air ozone generator in the room with an additional fan to eliminate the gaseous odor absorbed by the carpet, walls, wood and fabric furniture, mattresses etc.. Treat up to 48 hours depending on the severity of odors.

**DECOMPOSED PROTEIN: Suggested Size: PRO-3600-1, PRO-3600-5, PRO 5000, PRO 10000** Depending on the size of room to be treated.

Protein contamination is the result of food products such as milk, fish, meat, eggs etc. Other sources are from human or animal bodily discharge (like blood, urine, feces etc), decomposed meat, decomposed animal within a crawl space, death scene (decomposed body). In all cases of decomposed protein, the source of the odor must be removed as the first step to deodorization. (It is recommended that gloves and a respirator be worn to reduce the exposure to fleas and deadly contamination). Next treat the contaminated surfaces of the floor or any other items the protein was contacting with a liquid sanitizing solution to kill the contamination. Then a good liquid deodorizer like C20 or equivalent should be applied to all contaminated surfaces. Once the liquid sanitizing and deodorizing has been applied and has had time to dry 100%, the Crystal Air ozone generator may be placed in the treated area at a setting of medium to high to eliminate the gaseous odor absorbed by the walls and furniture etc. Use a strong fan to help force ozone into the pores of walls and furniture fabric. **Note # Ozone may be set on a low setting before the technician enters the room to deodorize the air in order to make the environment more comfortable to work in.**

**AUTOMOBILES TRUCKS BOATS & RVs:**

**Suggested Size: PRO 360, PRO 36R, PRO 3400-1, PRO-3600-1, PRO-3600-5** Depending on the size of room to be treated.

Cigarette smoke and most other organic vapors can be removed from a car, truck, boat, motor home etc in 30-45 minutes. Place Crystal Air ozone generator in automobile, roll windows down ½ inch, and adjust vent fan on full. Operate ozone at half to full for 30-45 minutes. Air out auto and smell for lingering odors. Repeat the procedure if necessary.

Note: Caution in areas of treatment using high levels of ozone. Treat all exposed natural rubber with a silicone spray or Vaseline in order to prevent cracking. This is not the case with fabric covered rubber cushions

**CAUTION:** Some auto odors are a result of chemical fragrance deodorizers that are non ozone depleting and therefore are very difficult to eliminate. Animal dander and oils embedded under the carpet, and sometimes must be lifted and cleaned with C20 or equivalent liquid deodorizer before treatment with ozone.

**BOAT & YACHT BILGE ODORS:**

**Suggested Size: PRO 360, PRO 36R, PRO 3400-1, PRO-3600-1, PRO-3600-5** Depending on the size of room to be treated.

Boat & yacht bilge odors are easily taken care of with a Crystal Air ozone generator & C20 liquid deodorizer. Just place ozone generator in bilge or living quarters when at dock and operate on full for 24 hrs. Ensure that all plants pets and people are removed for the duration of the deodorization process. Air out the living quarters before re entering. For heavy boat & yacht bilge odors use C20 liquid deodorizer prior to ozone application.

**GARBAGE ROOMS:**

**Suggested Size: PRO Series 3600-1, 3600-5, Depending on the size of garbage room** Place the Crystal Air ozone generator on a shelf above the door entrance positioned so the air stream blows away from the sensitive entrance area. An additional oscillating fan will greatly enhance the deodorization results by mixing all the contaminated air efficiently with the generated ozone. A shock treatment procedure may be required as the first step to treatment in a garbage room. (Refer to OZONE SHOCK TREATMENT PROCEDURE above), depending on the severity of odors prior to placement of Crystal Air ozone generator. Humid rooms may need dry air routed to the ozone generator with a four inch pipe or hose.

**COMPACTOR BINS:**

**Suggested Size: PRO 3600-1, 3600-5, 5000** Depending on severity of odor.

Crystal Air PRO series ozone generator have a hose adapter as a standard feature and can be ordered with secure SS mounting brackets. The ozone generator should be securely mounted to the compactor in such an area that is accessible for maintenance but not accessible to public or workers. Next cut a 4" hole in front of the ozone generator for the ozone to be routed through. Using a 4" PVC sewer pipe elbow, route the ozone through the hole that was cut out of the compactor in front of the ozone generator. Place an ozone controller in the compactor room to ensure that the ozone concentration does not exceed the maximum safe levels.

All procedures are basic. For more intense and extensive procedures, consult Crystal Air or refer to fire and flood manual for comprehensive procedures

**RULES OF THUMB:**

a. Odors created in a hot environment are embedded deeper in the pores of the materials such as curtains, furniture, wallboard etc. This is due to pores expanding when hot and closing when cold. A warm environment will always produce better results than a cold one when deodorizing a gaseous odor.

b. Humidity always enhances an odor. Existing odor causing contaminants like bacteria and fungus flourish in warm and humid environments.

c. Overkill and persistence is the successful way to deodorizing.

d. An additional fan of high output is necessary in all ozone treatments for optimum results. The fan will force the ozone into the small pores of the material to remove the odors absorbed.

e. In all decomposed protein, use a powerful sanitizer or bactericide and a powerful liquid deodorizer like C20 or equivalent.

f. Always use respirator and gloves when handling contaminated materials like rotten meats or dead animals.

g. Caution in areas of treatment using high levels of ozone. Treat all exposed natural rubber with a silicone spray or Vaseline in order to prevent cracking. This is not the case with fabric covered rubber cushions

h. Humid air supplied to the ozone generator will result in less ozone production. Dry air supplied to a generator will result in optimum ozone production.

**\*Caution:\***

The water in moist or wet surfaces of fabrics combined with high ozone may create Hydrogen Peroxide and result in bleached material. Avoid high humidity situations combined with high ozone concentrations.

**COMMON ODORS ELIMINATED WITH OZONE**

- Aged Books
- Hospital odors
- Alcohol Beverages (Bars, Lounges etc.)
- All organic waste
- Pet Odors
- Auto Exhaust
- Bacteria
- Kitchen Smells
- Oils and Greases
- Bathroom Odors
- Body Odors
- Burned Hair
- Burned Food
- Carbon Monoxide
- Methyl Mercaptan (Pet Urine)
- Mildew
- Mold
- Cigarette Smoke
- Rotting and Decaying Substances
- Most Organic Chemicals
- Paint Fumes
- Diesel Fumes
- Ripe or Rotten Foods
- Sewer Odors
- Fish Odors
- Smoke
- Stale or Stuffy Rooms or Buildings

**MARKETS FOR CRYSTAL AIR OZONE EQUIPMENT**

**OFFICE AND ENVIRONMENT**

(Unoccupied Areas)

- Garbage rooms
- Cigarette Smoke
- Mold odors
- Pet odors
- Mildew odors
- Maintenance rooms
- Damp basements
- Storage rooms
- Smoking lounges
- Restrooms
- Meeting rooms

**SHOPPING MALLS**

- Food court garbage areas
- Garbage compactors

**HOTELS & MOTELS**

- Garbage compactors (Unoccupied areas)
- Garbage areas
- Linen rooms
- Change rooms (Pool)
- Kitchens
- Lounges
- Health clubs (Weight rooms, locker rooms, dirty linen rooms)
- Restaurant or commercial industrial exhaust stack and gas stream.

**AUTOMOBILES & RVs**

- Cigarette Smoke
- Pet odors
- Mildew odors

**PROPERTY MANAGEMENT**

- ! Rental houses (Unoccupied)
- ! Apartments (Unoccupied)
- Deodorizing between rentals for (tobacco, ethnic food cooking odors, pet odors)
- Garbage rooms
- Garbage compactor
- Common recreation rooms

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