EP Lighting, Inc.

Case Study: Extended study in a Restaurant for ATP testing

EP Lighting, Inc further conducted studies using the Luminometer Hygiena™ Testing meter in a restaurant. The following case study shows the data obtained at 5, 15, and 30min time intervals, using the PRK300 series. In addition to the testing locations mentioned in the case study, couple additional locations (Hallway light switch and Restroom door knob) are selected.

The facility is a restaurant with large open space dining both indoor and outdoor. The kitchen, dining and the reception areas are usually crowded with employees and customers, and hence they are selected for the case study.

UV-KLEEN PRK unit is installed to disinfect the facility at the measured locations. The PRK unit is run for 30 min at all testing locations with measurements taken at 5th, 10th, and 30th minutes. At each testing location, at the 30th minute, the PRK unit is turned off and moved to another testing location.

The ATP swab test results are measured before, and after applying the UV-KLEEN are listed below.

Location #	Initial RLU	Final RLU			Reduction in RLU			Area of room	Location of PRK from testing area	Notes
		5 Min	15 Min	30 Min	5 Min	15 Min	30 Min			
1) DiningAreaCashRegister	1148	674	309	960	41%	73%	**16%**	600 sqft	5ft	Hidden spot, UV + Ozone
2) MainCashRegister	1245	975	530	384	22%	57%	69%	30ft long	9ft	
3) KitchenGriddle	2973	930	346	284	69%	88%	90%	500 sqft	5ft	Direct UV + Ozone
4) DiningAreaFloor	4126	2722	280	840	34%	93%	**80%**	Open Space	1ft	
5) Hallway LightSwitch	2854	1189	840	609	58%	71%	79%		8ft	Partial UV + Ozone
6) RestRoom Door Knob	218	160	409	182	27%	**-88%**	17%		10ft	Hidden spot, UV + Ozone

Table 1: Reduction in RLU at various locations in a restaurant using PRK unit

From Table 1, the measuring spots in locations 3 and 4 are exposed to the UV light directly along with the Ozone. Location 5 us 8ft away with partial UV exposure. However, the measuring points in locations 1, 2, and 6 are chosen in such a way that the UV light from the PRK is not directly shining on, but the Ozone was directed using an additional fan.

The reduction in the RLU is calculated using, (Initial value- final value)/initial value. From the data, the following observations are made:

1) The RLU reduction (organic material for the bacteria) is significantly observed as the disinfecting time is increased. Ex: the germicidal rate is 22% at 5th min on the Main Cash Register, and increased to 57% at 15th minute and 69% at 30th minute.
2) Closer the test location to the PRK, the higher the RLU reduction rate. Ex: Dining Area Floor
3) Direct UV exposure makes the disinfection quicker. Ex: Floor and Griddle. Tip: Elevate or move the PRK to directly hit the targeted area.

4) At the 30th minute, two locations showed considerable increase in the ATP values, Dining Area Cash Register and Dining Area Floor. EPL believes that the HVAC is turned on during this time period which circulated the air in the dining area, bringing the "infected area" through the "air return ducts" to the measurement location.
5) There MAY be a data error at Rest room doorknob. EPL believes that the initial ATP reading is not accurate.

Additional Study: The ATP measurement was taken at the 45th minute (the PRK is shut off at the 30th minute) at some measuring location and the following data is obtained.

Location #	Initial RLU	Final RLU		Reduction in RLU	
		30 Min	45 Min	30 Min	45 Min
1) DiningAreaCashRegister	1148	960	815	16%	**29%**
4) DiningAreaFloor	4126	840	410	80%	**90%**

Table 2: ATP reduction at 45th minute, when the PRK is turned off at 30th minute

The Ozone has a half-life and its dissipation to normal Oxygen depends on the airflow and size of the room. After 30 minutes of continuous Ozone generation, it took more than 20 minutes to completely dissipate the Ozone to normal levels. During this half-life period of 20 minutes, the Ozone in the room is still acting like a disinfecting agent, continuously reducing the ATP values. At location Dining area cash register, it is observed that there is an additional 13% (29% from 16%) reduction in the ATP values at 45th minutes, 15 minutes after the unit is completely turned off. Similarly, the Dining area floor is disinfected additionally by another 10%.

Conclusion: ATP meter is widely used in the hotel, restaurant, travel industries to check the cleanliness of the facility. The above case study is an extension of our previously published case study, showing that added disinfecting time significantly increased the germicidal efficacy of UV-KLEEN units. Hidden spots and hard-to-reach areas are successfully disinfected using the Ozone feature of the UV-KLEEN. The direct-to-hit UV areas are proven to be extremely effective in eliminating pathogens. Therefore, for efficient operation, it is highly recommended to use both the UV and Ozone features of the UV-KLEEN. It is also observed that the disinfection rates keep improving even after the units are turned off until the ozone is completely dissipated.

If you have any questions about this report, please contact us at info@uvkleen.us or info@eplightinc.com

Case Study: 3 Case Studies using ATP meter