

**Highly effective, dry, non-acidic,  
non-destructive cleaning system  
using intense UV light for removal  
of organic contaminants**

# UV Ozone Cleaner

- ◆ **Compact standard models**
- ◆ **12 inch wafer compatible models**
- ◆ **16 inch wafer compatible models**



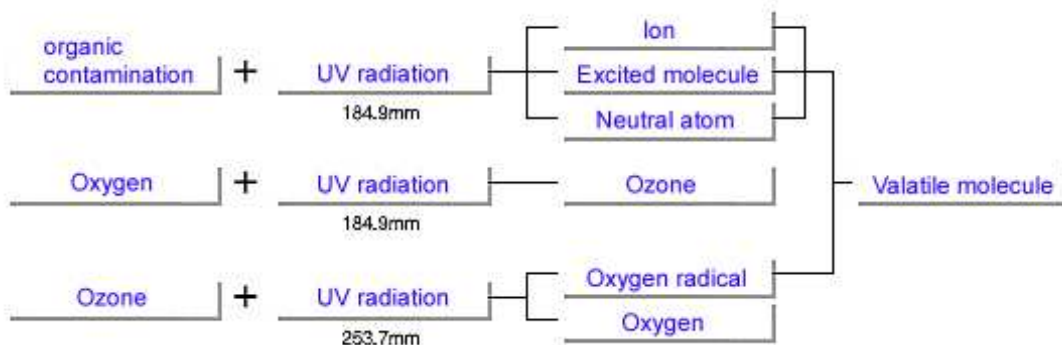
# What is UV ozone cleaning?

## Benefits of UV ozone cleaning

- Non-destructive cleaning method applicable for various types of substrates.
- Easy to remove organic contaminants on substrates which couldn't be completely cleaned by ultrasonication.
- Capable to remove residual organic solvents used in wet cleaning process.
- Operates at normal pressure. No vacuum required.
- Perfect solution for substrate pretreatment for thin film coating.

## Principal of UV Ozone Cleaning

UV ozone cleaning is a photosensitized oxidation process using short wavelength UV light. During this process, organic contaminants such as photoresist, resin, silicon oil, and flux are decomposed by absorbing UV radiation with short wavelength. Reactive oxygen species (ROS) are simultaneously generated when molecular oxygen is dissociated by 184.9 nm and ozone by 253.7nm. Most of the 253.7 nm UV light is absorbed by hydrocarbons and ozone. The products of the decomposed contaminants react with the ROS and form simpler volatile molecules (eg. CO<sub>2</sub>, H<sub>2</sub>O etc.), then detach from the substrate surface. When both 184.9 nm and 253.7 nm wavelengths UV light exist, oxygen atoms continue to be generated and turn into ozone, then the ozone decompose.



UV lights at the wavelength 184.9 nm and 253.7 nm equal to the UV energy of 647 KJ/mol and 472 kJ/mol respectively. Bonding energy of various organic combinations is listed in the right table.

Bond	Energy (KJ/mol)	Bond	Energy (KJ/mol)
O-O	138.9	C=C	607.0
O=O	490.4	C≡C	828.0
O-H	462.8	C=O	724.0
C-C	347.7	C-Cl	328.4
C-H	413.4	H-F	593.2
C-N	291.6	C-F	441.0
C≡N	791.0	H-Cl	431.8
C-O	351.5	N-H	390.8

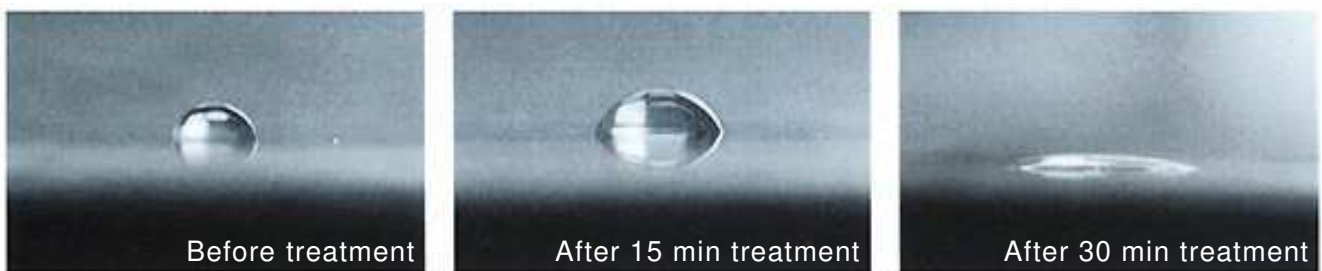
# A highly effective, dry, non-acidic, non-destructive cleaning method by photosensitized oxidation process using short wavelength UV light.

## Effect of UV ozone cleaning - improvement of wettability

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The following photos indicate improvement of wettability on glass surface by UV ozone cleaning. Before and after 15, 30 min treatment, same volume of Milli-Q water was dropped and its shape and contact angle were observed.

This suggests that organic contaminants on the surface were removed as time passes by UV ozone cleaning.



## Applications

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### Pretreatment of thin film coating

- Functional film cleaning (eg. ITO film)
- Substrate cleaning before several thin film deposition process
- Photoresist removal
- Cleaning for electronic-, mechanical-, and optical-components (eg. wafers, lens, mirrors, solar panels, LCD panels, and circuit boards etc.)
- Improvement of adhesion for protective coating on plastic surface.

### Electron microscope related

- Removal of organic contamination on SEM/TEM specimens
- Improvement of wettability and hydrophilicity for diamond or glass knives, and support film

### Others

- Cleaning for AFM cantilever
- PDMS surface modification
- Cleaning hermetic seal for ultra-high vacuum
- Removal of flux
- Etching for organic functional materials
- Glass degassing
- Removal of dicing tapes and marking ink from surface of wafers
- Annealing of Ta<sub>2</sub>O<sub>5</sub> film

# Features of Filgen's UV ozone cleaners



## No ozone leak

High concentration ozone is toxic for human and animals, and may cause deterioration of UV ozone cleaner itself and other lab equipment if it leaked from chamber.

Filgen's UV ozone cleaner, model UV253V8 equips a gas tight chamber with 0.02MPa of proof pressure. For other models, Ozone-Killer which is provided as standard can reduce risk for ozone exposure.

## Keep clean

Filgen's UV ozone cleaner has 2 intake ports for gas delivery both before and after UV ozone cleaning process, and 1 exhaust port. This enables to keep clean inside of chamber through whole cleaning process, by connecting with gas cylinders. Gas supply and exhaust are automatically controlled by solenoids.

## Different types of UV lamp

We, Filgen provide 2 types of UV lamp, made with fused quartz and synthetic quartz as standard and an optional ozone-free UV lamp, for all models.

\* Synthetic quartz UV lamps could radiate wavelength 184.9 nm lights more effective, and may improve whole cleaning efficiency.

## High power and uniform UV light

The grid UV lamps installed in Model UV253H/12H/16H deliver quite high powered and uniform UV light. We, Filgen also provide more affordable models equipped with straight tube UV lamps.

Grid UV lamp



Straight tube UV lamps



# Introduced to 400+ customers. Excellent customer support based on long-term experience and know-how.

## Compatible with 3 different sized wafers

Model UV253V8 and UV253H, compact standard models are compatible with 8 inch wafer. We also provide larger models compatible with 12 inch and 16 inch wafers. All Filgen's UV ozone cleaners equip a chamber of which more than 120 mm height, so enable to process various samples.



Compact standard  
Model# UV253V8



12" wafer compatible  
Model# UV253H12



16" wafer compatible  
Model# UV253V16



16" wafer compatible  
Model# UV253H16  
(with mount rack)

## Ozone-Killer, an external unit for ozone decomposition

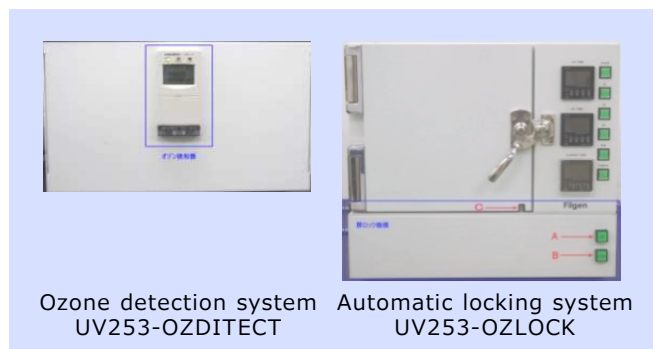
Ozone-Killer is automatically controlled by UV ozone cleaner, and offers safe decomposition of residual ozone. This external unit has the same appearance design and footprint with UV ozone cleaner.



Ozone-Killer UV253-OZ \*upper unit

## Optional accessories for more safely use

For users who are demanding higher safety, 2 optional accessories are available. Ozone detection system enables to monitor ozone concentration in the chamber, and Automatic locking system provides mechanical lock for the door during UV irradiation. These 2 units can be combined and offer the highest safety.

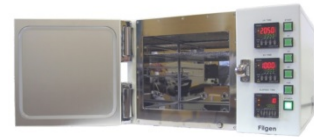


Ozone detection system  
UV253-OZDITECT

Automatic locking system  
UV253-OZLOCK

# Products

- ◆ Compact standard models
- ◆ 12" wafer compatible models
- ◆ 16" wafer compatible models



Compact standard  
Model# UV253V8



12" wafer compatible  
Model# UV253H12



16" wafer compatible  
Model# UV253V16

## Specifications – Compact standard models

Model#		UV253V8		UV253V8R		UV253H		UV253HR	
Chamber dimensions		204 (W) X 207 (D) X 142 (H) mm				208 (W) X 205 (D) X 168 (H) mm			
Light source	Type	Low-pressure mercury lamp, fused-quartz		Low-pressure mercury lamp, synthetic-quartz		Low-pressure mercury lamp, fused-quartz		Low-pressure mercury lamp, synthetic-quartz	
	Shape	Straight tube				Grid			
	Number of lamps	3				1			
	Wavelength	184.9 nm, 253.7 nm							
UV intensity		3.7 mW/cm <sup>2</sup> (per single lamp)				28 mW/cm <sup>2</sup>			
Timers	O2 timer	✓ (digital)				✓ (digital, shared with UV timer)			
	UV radiation timer	✓ (digital)				✓ (digital, shared with O2 timer)			
	N2 / exhausting timer	✓ (digital)				✓ (digital)			
	Operating time integrator	X				✓			
Ozone-Killer		Optional				Included			
Power outlet for Ozone-Killer						✓			
Safety inter-locking	UV lamps					✓			
	Gas supplies					✓			
External dimensions		400 (W) X 300 (D) X 260 (H) mm				400 (W) X 370 (D) X 270 (H) mm			
Power		100VAC 50/60Hz 5A				100VAC 50/60Hz 5A			
Optional accessories		Ozone-Killer / Flowmeters / Ozone detection system / Automatic locking system				Flowmeters / Ozone detection system / Automatic locking system			

## Specifications – 12" / 16" wafer compatible models

Model#		UV253V12		UV253V12R		UV253V16		UV253V16R		UV253H12		UV253H12R		UV253H16		UV253H16R	
Chamber dimensions		335 (W) X 330 (D) X 128 (H) mm		335 (W) X 330 (D) X 128 (H) mm		438 (W) X 430 (D) X 130 (H) mm		438 (W) X 430 (D) X 130 (H) mm		335 (W) X 330 (D) X 168 (H) mm		335 (W) X 330 (D) X 168 (H) mm		438 (W) X 430 (D) X 160 (H) mm		438 (W) X 430 (D) X 160 (H) mm	
Light source	Type	Low-pressure mercury lamp, fused-quartz		Low-pressure mercury lamp, synthetic-quartz		Low-pressure mercury lamp, fused-quartz		Low-pressure mercury lamp, synthetic-quartz		Low-pressure mercury lamp, fused-quartz		Low-pressure mercury lamp, synthetic-quartz		Low-pressure mercury lamp, fused-quartz		Low-pressure mercury lamp, synthetic-quartz	
	Shape	Straight tube								Grid							
	Number of lamps	5				7				3				6			
	Wavelength	184.9 nm, 253.7 nm															
UV intensity		5.2 mW/cm <sup>2</sup> (per single lamp)								28 mW/cm <sup>2</sup> (per single lamp)							
Timers	O2 timer	✓ (digital)								✓ (digital, shared with UV timer)							
	UV radiation timer	✓ (digital)								✓ (digital, shared with O2 timer)							
	N2 / exhausting timer	✓ (digital)								✓ (digital)							
	Operating time integrator	X								✓							
Ozone-Killer		Included								Included							
Power supply for Ozone-Killer										✓							
Safety inter-locking	UV lamps									✓							
	Gas supplies									✓							
External dimensions		530 (W) X 510 (D) X 270 (H) mm				630 (W) X 600 (D) X 280 (H) mm				530 (W) X 510 (D) X 480 (H) mm				630 (W) X 600 (D) X 480 (H) mm			
Power		100VAC 50/60Hz 15A								100VAC 50/60Hz 23A							
Optional accessories		Flowmeters / Ozone detection system / Automatic locking system / Mount rack															



# Consumables, Optional accessories

## UV lamps

3 types of lamps are available for all models. You can choose one depending on the purpose of use.

Model	UV lamps	Product No.
UV253V8	Straight tube, fused-quartz UV lamp, 3 pack (1 set)	UV253V8-L3
	Straight tube, synthetic-quartz UV lamp, 3 pack (1 set)	UV253V8R-L3
	Straight tube, ozone-free UV lamp, 3 pack (1 set)	UV253V8F-L3
UV253V12	Straight tube, fused-quartz UV lamp, 5 pack (1 set)	UV253V12-L5
	Straight tube, synthetic-quartz UV lamp, 5 pack (1 set)	UV253V12R-L5
	Straight tube, ozone-free UV lamp, 5 pack (1 set)	UV253V12F-L5
UV253V16	Straight tube, fused-quartz UV lamp, 7 pack (1 set)	UV253V16-L7
	Straight tube, synthetic-quartz UV lamp, 7 pack (1 set)	UV253V16R-L7
	Straight tube, ozone-free UV lamp, 7 pack (1 set)	UV253V16F-L7
UV253H	Grid, fused-quartz UV lamp, 1 pack (1 set)	UV253H-L
	Grid, synthetic-quartz UV lamp, 1 pack (1 set)	UV253HR-L
	Grid, ozone-free UV lamp, 1 pack (1 set)	UV253HF-L
UV253H12	Grid, fused-quartz UV lamp, 3 pack (1 set)	UV253H12-L3
	Grid, synthetic-quartz UV lamp, 3 pack (1 set)	UV253H12R-L3
	Grid, ozone-free UV lamp, 3 pack (1 set)	UV253H12F-L3
UV253H16	Grid, fused-quartz UV lamp, 6 pack (1 set)	UV253H16-L6
	Grid, synthetic-quartz UV lamp, 6 pack (1 set)	UV253H16R-L6
	Grid, ozone-free UV lamp, 6 pack (1 set)	UV253H16F-L6

## Ozone-Killer

An optional accessory for ozone decomposition. Capable to use our UV Ozone cleaner safely without any local ventilation systems. Exclusive for the model# UV253V8(R)

Ozone decomposition method	Catalytic
Exhausting speed	6 L/min
External dimensions	400 (W) x 300 (D) x 110 (H) mm
Power	100VAC 50/60Hz 1A

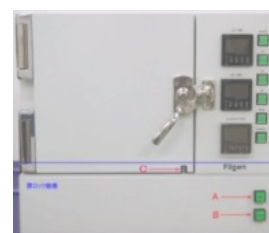
## Ozone detection system

Enable to check ozone concentration in chamber. Provide the highest safety when combined with Ozone-Killer and Automatic locking system.



## Automatic locking system

Decrease risks against ozone exposure and UV irradiation. During UV radiation, an mechanical lock prevents door open due to human error.



For more details, please check our website: <https://filgen.jp/Product/Sl/English/UV/>



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(JUL 2019)