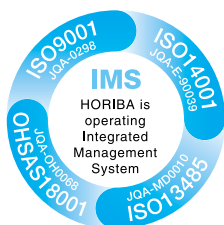


## BHF Monitor

CS-137



CS-137

### **24-hour real-time monitoring of BHF solution concentrations (NH<sub>4</sub>F/HF/H<sub>2</sub>O) in semiconductor wet-etching processes**

The CS-137 is a high-precision chemical solution concentration monitor designed to meet the strict demands of semiconductor wet-etching processes. Etching processes use BHF solution to etch silicon oxide and remove particles from the wafer surface. The CS-137 continually monitors each component of the BHF solution (NH<sub>4</sub>F/HF/H<sub>2</sub>O), alerting the user each time the solution is replaced or replenished. This allows you to maintain the concentration of the BHF solution within the tolerance range, while eliminating unnecessary solution replacement.

#### Features

##### **Short 3-second measurement cycle supports concentration control for 300-mm processes**

A short measurement cycle of approximately three seconds makes it possible to track concentrations at much closer to real time. Supports fine-tuned concentration control for batch-type-bath as well as single-bath cleaning devices.

##### **Compact design helps reduce cleaning-device footprint**

The compact design reduces the monitor's footprint by about a third\*, reducing the amount of space required by the cleaning device. The monitor is easily integrated with the cleaning device.

\*Based on comparison with the HORIBA CS-327 series.

##### **Reduces lot defects in the cleaning process for improved yield**

Output from the monitor is used for automated spiking control of the BHF solutions, enabling cleaning with a high reproducibility rate. As a result, lot defects decrease in the cleaning process, which helps to boost the overall yield.

##### **Fully automated measurement simplifies control**

All the user has to do is set up the BHF solution supply. Measurement is fully automatic, so no control whatsoever is required once the measurement has begun. Also, air is used for reference spectral measurement, and water concentrations can also be measured, which allows continuous tracking of changes in water concentration due to evaporation of the solution and adherence to the wafer. This allows fine-tuned control of silicon-oxide etching.

##### **Comprehensive measures to eliminate air bubbles enable continuous measurement**

A built-in bubble removal function removes air bubbles immediately before the flow cell, which allows continuous measurement of the solution as it is flowing.

##### **24 V DC used for improved safety**

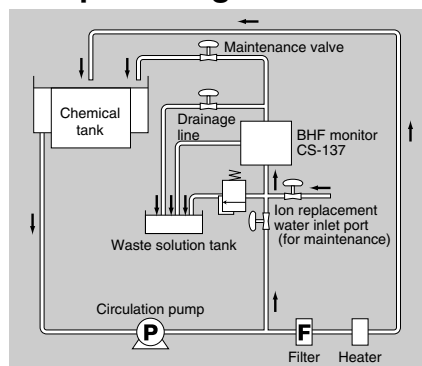
The monitor uses a low-voltage (24 V DC), and running on about 45 W gives it even better electric-shock safety and energy efficiency. An internal leakage sensor is also installed to detect solution leaks, so that the supply of BHF solutions can be shut off in the event of an emergency.

## Specifications

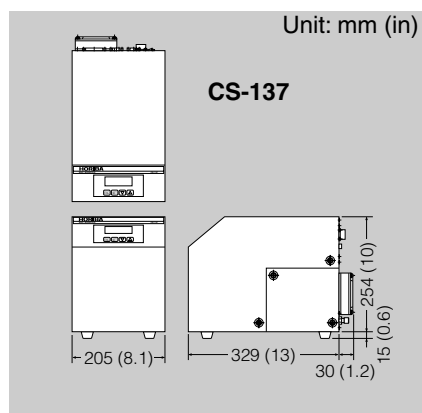
Model		CS-137	
		CS-137-2103	CS-137-1003
Measurement sample	BHF (Hydrofluoric acid/Ammonia fluoride solution)		
Measurement principle	Absorption spectrometry		
Concentration computation principle	Temperature-compensated multivariate analysis		
Measurement range	NH <sub>4</sub> F: 15.0 to 21.0 % HF: 0.00 to 3.00 % H <sub>2</sub> O: 72.0 to 85.0 %	NH <sub>4</sub> F: 0.0 to 10.0 % HF: 0.00 to 3.00 % H <sub>2</sub> O: 87.0 to 100.0 %	
Reproducibility (Peak to peak)	NH <sub>4</sub> F: ±0.3 % HF: ±0.25 % H <sub>2</sub> O: ±1.0 %	NH <sub>4</sub> F: ±0.3 % HF: ±0.25 % H <sub>2</sub> O: ±1.0 %	
Chemical conditions	Temperature	20 to 30°C	
	Flow rate	20 to 60 ml/min.	
	Pressure	0.10 to 0.20 MPa	
Measurement cycle	Approx. 3 seconds minimum		
Equipment temperature	20 to 30°C		
Operation panel	1) Temperature level display: Ammonia fluoride solution, Hydrofluoric acid, Water 2) Alarm display (Ammonia fluoride solution, Hydrofluoric acid): Concentration low-low limit, Concentration low limit, Concentration high limit, Concentration high-high limit 3) Alarm value settings (Ammonia fluoride solution, Hydrofluoric acid): Concentration low-low limit, Concentration low limit, Concentration high limit, Concentration high-high limit		
Serial input/output	RS-232C 1) Concentration data: Ammonia fluoride solution, Hydrofluoric acid, Water 2) Alarm value settings (Ammonia fluoride solution, Hydrofluoric acid): Concentration low-low limit, Concentration low limit, Concentration high limit, Concentration high-high limit		
Parallel input	12 to 30 V DC (photocoupler insulated) Parallel concentration alarm (ON/OFF)		
Parallel output	Maximum current when open collector output is ON: 5 mA Maximum voltage when open collector output is OFF: 30 V 1) Alarm output: Ammonia fluoride solution, Hydrofluoric acid: Concentration low-low limit, Concentration low limit, Concentration high limit, Concentration high-high limit 2) Device error (including liquid leakage) 3) Under measurement		
Analog output	4 to 20 mA (2 outputs: NH <sub>4</sub> F concentration, HF concentration)		
Power	24 V DC ±10%, 2 A		
Dimensions	205 (W) x 329 (D) x 269 (H) mm 8.1 (W) x 13 (D) x 10.6 (H) in		
Mass	Approx. 11 kg		
Connection pipe size	For inlet and outlet: Outer diameter 6 mm (inner diameter 4 mm)		
Pipe connection	Nippon Pillar Super type		

Please consult Horiba concerning any specifications not listed above.

## Sample configuration



## External dimensions



**⚠ Please read the operation manual before using this product to assure safe and proper handling of the product.**

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