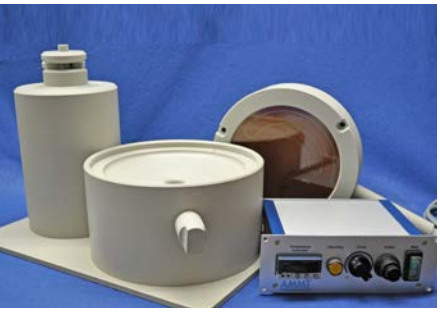
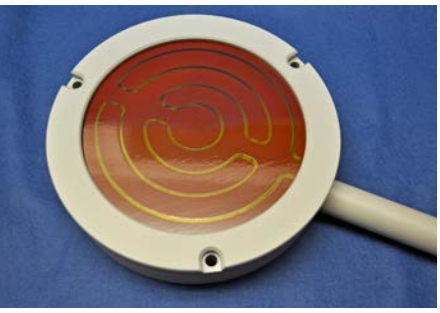
HF VAPOR ETCHER
HFVE STANDARD

HFVE Standard with electronic control unit





HFVE Standard electrotatic chuck

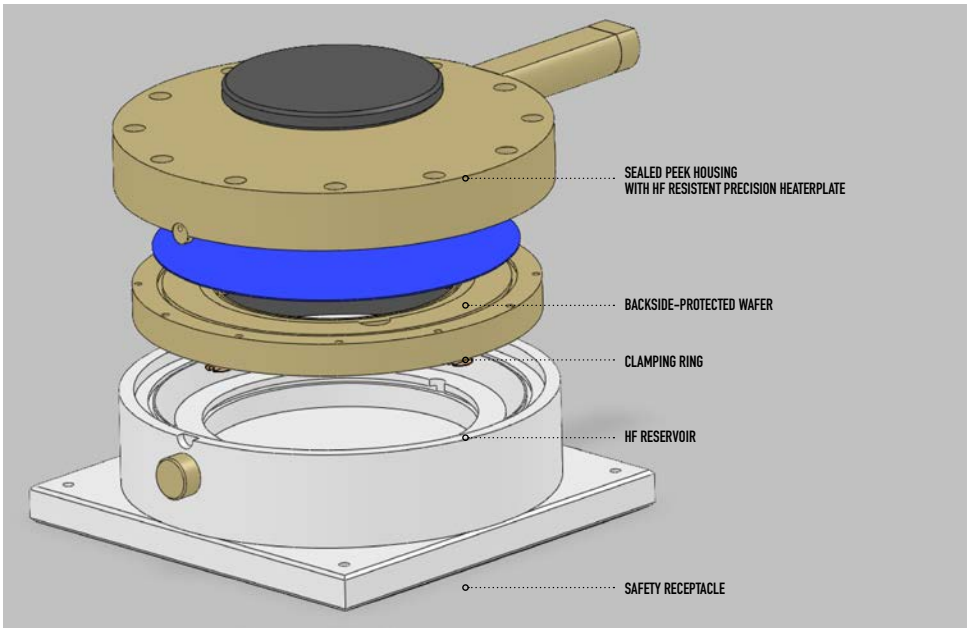
Hydrofluoric acid (HF) is an ideal etchant for all silicon oxide types used in micromachining, allowing fast etch rates and being highly selective to silicon. A typical application for HF etching is the removal of sacrificial oxide layers in MEMS fabrication. However, it is typical for liquid-phase etchants to have a high risk of the movable structure sticking to the substrate due to the effects of surface tension.

AMMT's HF Vapor Etcher solves this problem by working entirely in the vapor phase. HF vapor is generated passively from a small liquid reservoir, ensuring a small footprint of the system. The HF Vapor Etcher is perfectly adapted to surface micromachining, SOI-MEMS, dicing-free release, structure thinning, and many other applications.

The wafer is mounted onto the reservoir with the etching side facing down. The HF vapor reacts with the SiO on the wafer surface to form volatile SiF4, which readily desorbs from the surface. The reaction also requires small amounts of water to be present on the surface. In order to ensure a film of microscopic water on the surface without producing droplets which could cause sticking, the wafer is gently heated from the back side by an HF-resistant precision heater plate. An excellent etching homogeneity is achieved by a special heater design, which reduces temperature gradients over the wafer that could potentially affect the etch rate.

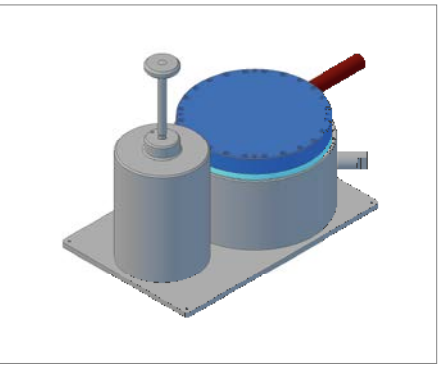
Safety is important when working with HF. AMMT's engineers have designed an easy-to-use etching system with a maximum of security, including an easy to use HF storage device which allows to fill and drain the reaction chamber with HF liquid.

For full wafers the HFVE comes with a clamping ring to seal the wafer edge and back side using a double O-ring system. For small chips the HFVE heated wafer chuck can also be equipped with an electrostatic clamping device.



AMMT

上海办事处：
丽赫科学仪器（上海）有限公司
Tel: 400-840-1510
http://www.bihec.com/advanced-micromaching-tools



NOTE: Hydrofluoric acid (HF) is an extremely dangerous substance to work with. Special care has to be taken when installing, maintaining and operating this system. In particular, a secure mount of the device and an appropriate vapor extraction has to be assured. AMMT can provide information about the installation and operation of the PSB, but will not assume any responsibility for harm or damage caused by using this product.

Product code	HFVE 100	HFVE Std. 150	HFVE Std. 200
Wafer size	4" (100mm) or smaller	6" (150mm) or smaller	8" (200mm) or smaller
Etchant compatibility	HF 50%, mixtures of HF and organic solvents		
Etching characteristics			
Etch rate Etching homogeneity Back side protection Etching exclusion Etched materials Resistant materials	2-30 µm/h Typically 90% (on wafer surface); min 50% Typically 3mm exclusion from the edge 5 mm from the edge of the clamping ring Silicon dioxide (SiO2) Silicon, poly-silicon, noble metals, aluminium		
Wafer holder with heating plate			
Operating temperature	35°C to 60°C ; 95°F to 140°F		
Wafer clamping:			
Mechanical clamping ring	For 100 mm wafers (other sizes optional)	For 150 mm wafers (other sizes optional)	For 200 mm wafers (other sizes optional)
Wafer contact	6 clips @ Ø 94 mm	8 clips @ Ø 144 mm	8 clips @ Ø 194 mm
Mechanical clamping	Screwing with 4 large nuts from backside; nuts never in direct contact with HF acid vapor		
Electrostatic clamping (optional)	For single chips (>5x5 mm2) as well as 100 mm wafers	For single chips (>5x5 mm2) as well as 150 mm wafers	For single chips (>5x5 mm2) as well as 200 mm wafers
	For all conductive materials		
	Bipolar type		
Reaction chamber & reservoir	Communicating vessels Safe acid handling system Reuse of HF acid		
Etchant volume	100ml (max. 160 ml)	200ml (max. 290 ml)	250ml (max. 400 ml)
Controller			
Power supply	110 V AC 60 Hz or 230 V AC 50 Hz		
Fuse	110V T2.5A or 230V T1A		
Power consumption	150VA		
Electrostatic clamping	Max. 1500V DC		
Electrostatic force controller	Max. 12V DC		
Front panel protection	IP65 (spray water resistant)		
External Dimensions (mm)			
Wafer holder	Ø165 x 50 (with handle: 165 x 300 x 50)	Ø210 x 50 (with handle: 210 x 340 x 50)	Ø260 x 50 (with handle: 260 x 390 x 50)
Reaction chamber with reservoir (l x w x h)	340 x 200 x 250	400 x 245 x 250	455 x 295 x 250
Controller unit (w x h x l)	200 x 150 x 200		
Installation			
Need of	Acid fume hood with air extraction Electrical power supply Water for rinsing		