

STACIS[®] 2100

Active Piezoelectric Vibration
Cancellation System



www.gmp.ch

STACIS® 2100

Active Piezoelectric Vibration Cancellation System

STACIS® is the world’s most advanced active vibration cancellation system. Employing advanced inertial vibration sensors and state-of-the-art piezoelectric actuators, STACIS cancels vibration in real time by sensing floor vibration, then expanding and contracting piezoelectric actuators to filter out floor motion.

Primarily designed to isolate precision microlithography, metrology, and inspection equipment in advanced semiconductor factories, STACIS is now the industry standard solution for the most sensitive instruments in noisy environments.

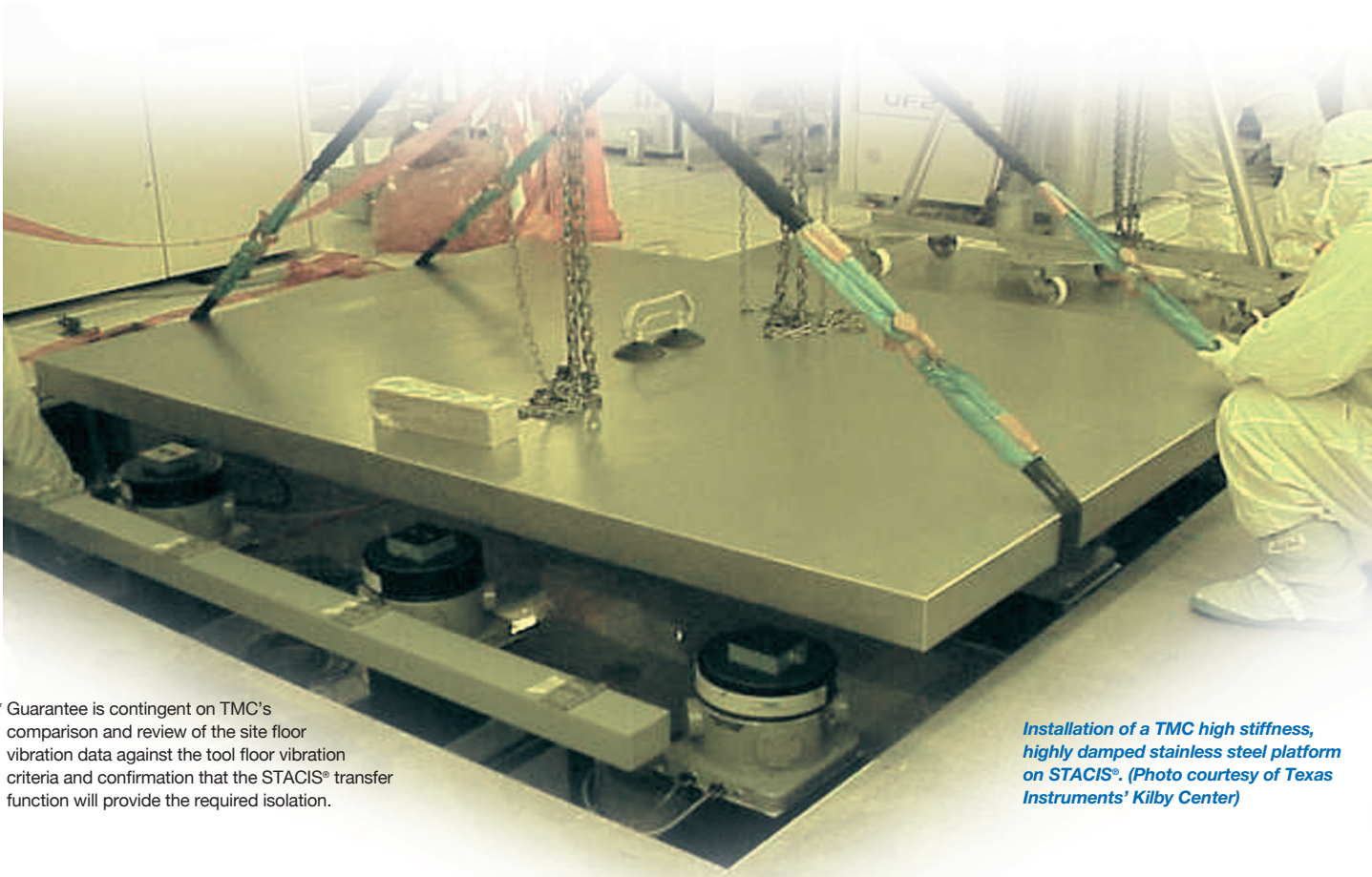


Hundreds of times stiffer than air isolators, STACIS suffers from none of the limitations of air systems. There is no “soft” suspension and, unlike active air systems, STACIS can be “stacked” (placed beneath a tool with an internal active air isolation system).

In addition to facilitating optimal tool performance and resolution in noisy fabs,

STACIS is guaranteed to meet the floor vibration specifications of wafer inspection, metrology and micro-lithography tools.*

With many hundreds of successful installations worldwide, STACIS is the ideal vibration isolation system for the most vibration-sensitive instruments.



Installation of a TMC high stiffness, highly damped stainless steel platform on STACIS®. (Photo courtesy of Texas Instruments' Kilby Center)

* Guarantee is contingent on TMC’s comparison and review of the site floor vibration data against the tool floor vibration criteria and confirmation that the STACIS® transfer function will provide the required isolation.

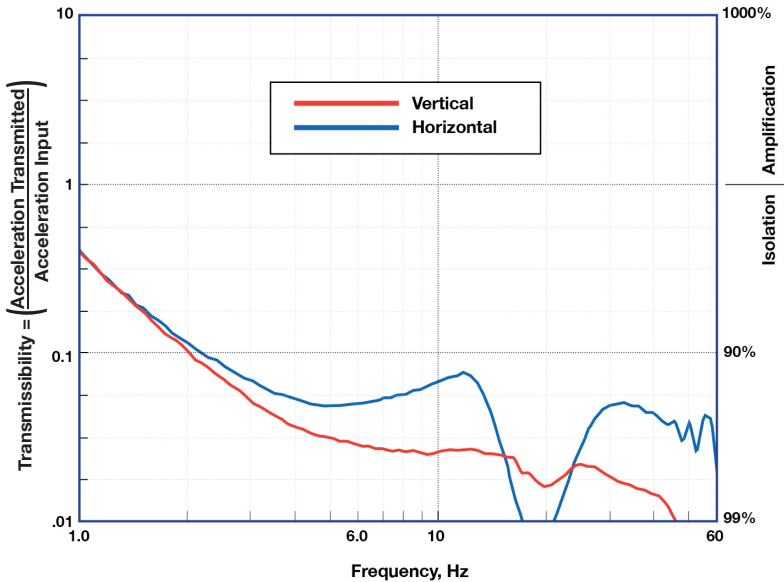
Features & Benefits

- Vibration isolation starts at 0.6 Hz, with 40% to 70% isolation at 1 Hz
- Provides greater than 90% isolation at frequencies 2 Hz and higher, vertical and horizontal
- Reduces fab floor construction costs, allows tools to be installed in higher vibration environments
- Active bandwidth, 0.6 Hz to 150 Hz
- Recommended by many tool manufacturers
- 6 degree-of-freedom active hard mount design, no soft air suspension
- Installs easily, robust control system requires minimal or no on-site compensation
- A point-of-use solution that is compatible with all internal tool vibration isolation systems
- Ensures tool vibration criteria will be met as vibration levels increase over time
- Uses TMC’s patented STACIS® technology to cancel vibration using piezoelectric actuators
- Enables older and noisier floors to accommodate state-of-the-art tools
- Compatible with various floor heights and sub-floor geometries in fabs
- Increases throughput, quality and yield

STACIS® Ordering Chart

Catalog Number	Description
21-301-01	STACIS, 3-mount, low capacity
21-301-02	STACIS, 3-mount, medium capacity
21-301-03	STACIS, 3-mount, high capacity
21-401-01	STACIS, 4-mount, low capacity
21-401-02	STACIS, 4-mount, medium capacity
21-401-03	STACIS, 4-mount, high capacity

Transmissibility



STACIS® 2100 on a “riser” installed under a TMC platform in a 36” tall raised floor

General Specification (may vary depending on configuration)

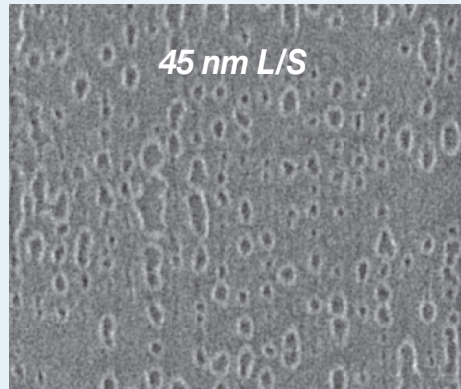
DC-2000 Digital Controller		Performance Specifications		Dimensions, Environmental & Utility Requirements	
Analog inputs/outputs	16 channels (16/14 bit)	Active degrees of freedom	6	Isolator size	11.75 in. (w) x 12.5 in. (d) x 10.8 in. (h) (300 x 320 x 275 mm)
Digital inputs/outputs	16	Active bandwidth	0.6 to 150 Hz	Isolator weight	75 lb (34 kg)
Sampling rate	6.5 KHz nominal	Natural frequency	Passive elastomer: 18 Hz Effective active resonant frequency: 0.5 Hz	Controller size	19 in. (w) x 15 in. (d) x 1.75 in. (h) (483 x 381 x 44 mm)
Front panel	Two-line LCD with soft menu keys	Isolation at 1.0 Hz	40% - 70%	Temp., operating	50° to +90°F (10 to 32°C)
	BNC input and output for signal monitoring	Isolation at 2.0 Hz and above	90% or better	Temp., storage	-40° to 255°F (-40 to 125°C)
	Two RS-232 communication ports (second port on rear)	Settling time after a 10 lb (4.5 kg) step input (10:1 reduction)	0.3 sec	Humidity, operating	30 - 60%
	Tri-color system status lamp	Internal noise	<0.1 nm RMS	Power required	100, 120, 230 or 240 volts; 50/60 Hz; < 600 watts, CE compliant
Physical	Single RETMA rack unit height x 15 in. deep	Operating load range per isolator (different passive mounts required) Isolator overload safety factor	400 - 4,500 lb (182 - 2,045 kg) > 2:1	Floor displacement	< 480 µ in. (12 µm) below 10 Hz
Power	90-240 VAC, 50-60 Hz, 600 watts max.	Number of isolators	3 or 4 typical	Options: TMC laminated, stainless steel platforms, frames, and “risers,” leveling devices, earthquake restraints, and lifthoods	
Other	Power connector for support of external devices	Stiffness (1,000 lb/454 kg mass) (typical middle capacity isolator)	40,000 lb/in. (73 x10 ⁵ N/m)		
		Magnetic field emitted	< 0.02 micro-gauss broadband RMS		

APPLICATION NOTE

Impact of Vibration on Advanced Immersion Lithography (actual customer supplied data)

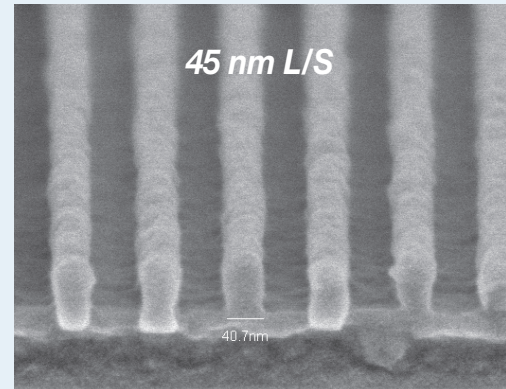


The 45 nanometer line-width test patterns shown were produced with an advanced Immersion Lithography System manufactured by Amphibian Systems and installed at SEMATECH in Austin, Texas. Variation between the images is due to the effect of seismic vibration on the photolithography process. The images shown were obtained using a scanning electron microscope.



Without STACIS®...

Best pattern obtained on either the elastomer or rigid version of original pedestal.

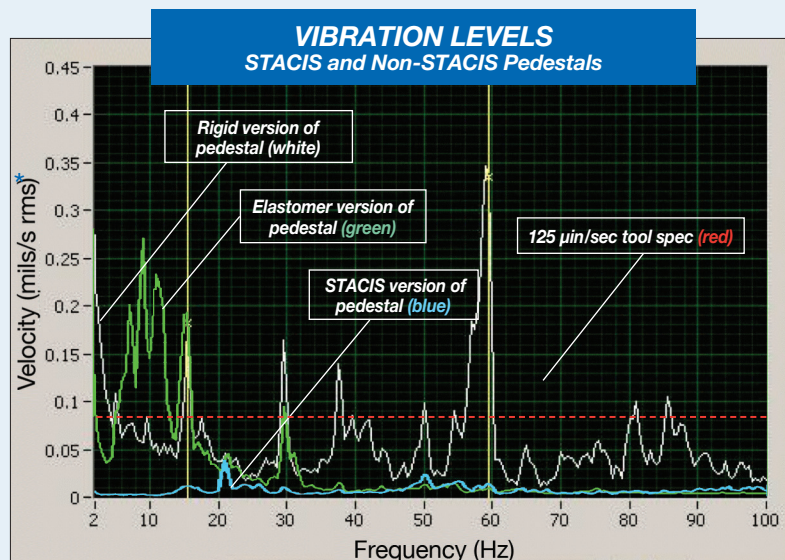


With STACIS®...

Pattern achieved with STACIS active vibration isolation.

The tool was initially installed on a steel and concrete plinth with a steel support structure which incorporated commercial elastomer vibration isolation pads. This pedestal did not achieve the tool's specified vibration criteria and pattern quality was poor.

In an attempt to reduce vibration, the elastomer pads were effectively shorted out with metal shims leading to a more rigid, non-resonant structure but this resulted in little improvement. The vibration criteria were not met with either version of the pedestal and pattern quality remained poor.



*Vertical Axis Data shown

The plinth support structure was removed and retrofitted with a STACIS® Active Piezoelectric Vibration Cancellation System. The STACIS mounts were placed directly beneath the existing plinth. Supporting the tool on STACIS resulted in a dramatic reduction of overall seismic vibration levels and achievement of the manufacturer's floor vibration specification. More importantly, STACIS provided a dramatic improvement in pattern quality.

Photos, images, and vibration data courtesy of SEMATECH.