FIXTURE DESIGN

Repetitive shock fixture design is critical and can determine the success or failure of test result outcomes. A good fixtre can determine a level of consistency and repeatability in production screening. In factory environment, a good fixture enables manufacturing team members to load, unload, and maximize throughput with ease and repeatability. ESPEC delivers experience, knowledge of the process, and technical expertise - not just the fixture, but the table too.

ESPEC has been at the forefront of delivering Repetitive Shock fixturing design worldwide for over 20 years.

	Different Vibe Systems, Different Fixturing			
	ED (Electrodynamic) Shaker		RS (Repetitive Shock) Vibration	
	fixture design characteristics:	COMPARED TO	fixture design characteristics:	
		Light		
Rigid		⊠ Flexible		
Mimic mounting of product in normal use		Mounting position irrelevant due to 6 degree of freedom vibration		
□ Carefully	designed to transmit vibration with min		signed to maximize vibration transmission withounging the frequency content	

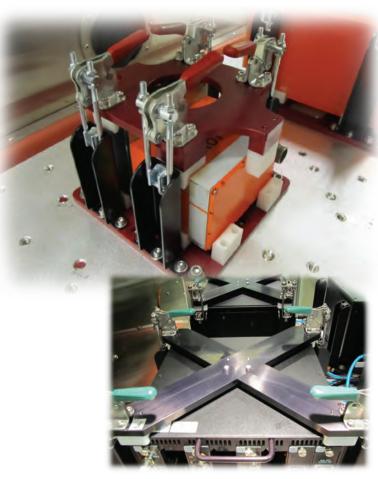
Different Fixture Methods are Needed for HASS

- Designed specifically to rapidly fatigue products
- ☑ Components have varying resonant frequencies
 - > Excite the resonant frequency of all components
 - Regardless of Frequency
 - Regardless of Orientation

HASS Fixture Development

- Custom Design to Ensure Consistent and Effective Screen
- Fixture Attributes
 - Vibration Transmissibility
 - Temperature Response
 - Consistent Stress Location to Location
 - Fast Product Change Over
- ☑ Fixture Qualification

ESPEC fixturing services available for these models: OVTT, Typhoon, QFusion, HawQ, Mechanical HALT



Fixture Development Process

PRE-ENGINEERING

Gather all pertinent data regarding:

- 1. Product information dimensions, samples, connections
- 2. Fixturing requirements total qty, cycle qty, spatial considerations
- 3. Testing requirements estimated test limits, cycle time, functional testing
- 4. Schedule milestone dates

Output: Requirements documentation

DESIGN

- 1. Create initial design
- 2. Design review and modifications as needed
- 3. Build prototype
- 4. Design validation and qualification

Output: Validation/qualification report, prototype fixture

PRODUCTION

- 1. Order, build and assemble full complement of fixtures for application
- 2. Perform quality control verifications Output: Full set of qualified fixtures ship to customer.

FIXTURE INSTALLATION AND INTEGRATION

- 1. HASS system with full complement of fixtures installed and fully loaded with new product, all electrical and mechanical interconnections
- 2. Integration qualification to assure consistent thermal and vibration response at each product location within the chamber. Repeatability verified to assure consistent test response over time

Output: Qualified and verified production. Fixture integration report

PROOF OF SCREEN

- 1. Determine HASS thermal and vibration stress levels
- 2. Determine functional testing protocol
- 3. Conduct screen effectiveness test
- 4. Conduct safety of screen test
- 5. Finalize test parameters

Output: Final production report



ESPEC Fixturing Deliverables

Discussion with Customer about Product and Testing requirements

· Create initial schedule and cost

Provide Fixture Concept to Customer

- · Introduction pdf document showing fixture and product
- $\cdot\,$ E-Drawing (3D Cad viewable model) of single fixture concept

Fixture Concept Design Review w/ Customer

- · Via phone or web, discuss all details about fixture design and implementation
- · Schedule Status Update
- · Acquire customer signoff on acceptable fixture design Finalize Fixture
- ESPEC Manufactured and Assembled Fixtures (prototype or production quantities)