



C O R P O R A T I O N

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## Technical Data Sheet

### "Vacube" Vacuum Cube Fixture

TDS-19

#### CUBE

The "VACUBE" Cube Fixture consists of a cast KIA Magnesium Cube with internal ribs to provide rigidity and minimize weight. FOR ANY TEST LOAD OVER 5 KG, THE CUBE SHALL BE SUPPLIED WITH AUXILIARY HYDRAULIC CLAMPS FOR ADDITIONAL HOLD DOWN FORCE. The Cube Fixture is to be provided with Interface Plates for attachment of test items. The Fixture shall be mounted on an electrodynamic shaker or sliptable for vibration test of three axes.

#### CONCEPT

The Cube Fixture is attached to an electrodynamic shaker, or sliptable through the conventional method of attachment bolts in the counterbored holes provided with the cube. A 1/8 inch thick lightly pressed steel washer is supplied in the counterbore hole. The cube need only be attached once as each surface of the cube shall act as a separate orthogonal axis.

The Interface Plates are attached to the cube fixture with high pressure hydraulic clamps and vacuum plumbed to the center of all three Interface Plates to insure full contact to the cube fixture during vibration. The use of clamps and vacuum allows for a quick release mechanism for changing the Interface Plates.

The Cube Fixture consists of an entire operating system. Included will be an electrical hydraulic fluid pump capable of pressures to 7500 PSI, an electrical vacuum pump to provide 25 HG to the center of each Interface Plate and an operating console to run the entire system. All of the components may be mounted on a roll cart for ease of mobility. This cart shall be supplied by the customer.

#### PROPOSAL

A. M/RAD Drawing P1398, Sheets 1 and 2 and a PLAN VIEW Drawing are enclosed to demonstrate the fixture concept proposed by M/RAD. The cube will adapt to any customer selected shaker armature hole pattern and shall pick up every insert on the shaker armature. The 14 inch cube shall consist of cast KIA Magnesium with internal ribs to maximize rigidity and minimize weight.

B. The Interface Plates (1 inch thick) shall attach to the cube via the following quick release mechanisms:

1. Vacuum, plumbed through the cube compartments, to hard mount the Interface Plates in their center on three faces of the cube.
2. Double Acting Swing Clamps, P/N CLR-121-SCDH, Qty 6 each on two vertical faces and the top of the cube (3 faces total), shall be provided to supply additional clamping force (4200 lbs, at 6000 psi) in addition to the vacuum. The swing clamps are super-miniature and weigh only 1.2 lbs each. The swing clamps shall hard mount the Interface Plates on their edge. These swing clamps shall be mounted on clamp plates (thickness as required) which shall be bolted to the cube. See M/RAD Drawing P1398, Sheet 1 for detail.

Note that the clamp plates are removable so that the insert face of the cube may be exposed.

C. The vacuum pump and motor, P/N 4Z335, 1/4 HP, shall be rated for continuous duty at 27 inches of mercury and shall be provided with a gauge to indicate pressure..

The Swing Clamp Electric Power Unit, P/N CLR-803-EP, shall be rated for continuous duty and shall be provided with a gauge.

D. Fixture Weight:

ITEM	QTY	UNIT WEIGHT	TOTAL WEIGHT
1. Cube	1	113 lbs	113 lbs
2. Interface Plates	3	17.7 lbs	53.1 lbs
3. Clamp Plates	2	14	28 lbs

E. M/RAD proposes the following Acceptance Criteria:

1. Below 500 Hz: +/- 15% of the input control signal
2. 500 - 750 Hz: +/- 25% of the input control signal
3. 750 - 1000 Hz: +/- 50% of the input control signal
4. 1000 - 2000 Hz: +/- 100% of the input control signal

There will be no major fixture modes below 500 Hz.

F. The fixture shall be easy to use, efficient and reliable and shall be designed to be used in a production environment by production operators. Pushbutton control shall be supplied to energize and de-energize the swing clamps and vacuum. QTY 2 tapered pins on each of 3 faces shall be so that the Interface Plates may be quickly located on the cube. QTY 4 pin holes shall be provided on each interface plate to allow for 90 degree rotation.

G. A head expander is not necessary for this application

H. Three sets of detailed drawings and operating instructions shall be provided for documentation and maintenance purposes.

I. As the fixture is manufactured from KIA and AZ31B magnesium, M/RAD will utilize our standard magnesium finish.



