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## Shock Testing Equipment

### Pneumatic Shock Machine



2424(550)P-MP

The M/RAD Pneumatic Shock Machine will produce a pulse in the vertical direction using compressed air to force the carriage to impact on the shock machine base. Elastomer pads are used between the carriage and the base to generate half-sine pulses, lead pellets for sawtooth pulses and gas generators for square or trapezoidal pulses. The design of these programmers effect the time duration of the pulse while the air pressure and drop height determine the magnitude (G level) of the shock pulse.

The basic structure of the machine is heavy steel which will not deteriorate under repeated shocks. The structure contains sufficient mass so that no additional ballast will be required. The structure is supported on four passive air springs to isolate the shock pulses from the floor. All major components are located on the OUTSIDE rear surface of the shock machine base for ease of maintenance and adjustment.

The test item mounts on a solid aluminum carriage provided with steel inserts on the top surface. The carriage is supported and guided by the lifting and driving piston. Dual caliper friction brakes are used as a rebound brake and as a quick release mechanism.

A microprocessor is provided to:

1. Actuate the rebound brake
2. Set the drop height
3. Count the number of shocks

The sequence of operation is as follows:

1. The upper chamber of the air cylinder is opened to the atmosphere.
2. A solenoid valve is opened to pressurize the lower chamber of the air cylinder and thereby slowly raises the carriage to the desired drop height which is preset by the microprocessor. The brakes are now engaged to lock the table in this position.

3. A solenoid valve is opened to pressurize the upper chamber to the preset pressure. Once the pressure is reached, a relay is energized which allows the carriage to be dropped. Until this point in the sequence, the carriage could be raised or lowered, but not dropped.
4. On command, the carriage is dropped by releasing the brakes. The carriage makes contact with the appropriate programmer to generate the shock pulse.
5. On impact, the microprocessor is engaged to energize the brakes to prevent rebound.
6. Return to step 1.

The above sequence may be executed manually or automatically sequenced for repeated drops. The controls are mounted in a control panel on the front of the machine. All regulators, gauges, signal lights, relays and push buttons are located here.

**SPECIFICATIONS**

| Model No.   | 0909(50)P-MP   | 1616(100)PA-MP   | 1616(200)P-MP  | 2424(550)P-MP   |
|---|--|--|--|---|
| Table Size and Weight                                 | 9 in x 9 in<br>40 lbs  | 16 in x 16 in<br>150 lbs   | 16 in x 16 in<br>150 lbs   | 24 in x 24 in<br>450 lbs  |
| Maximum Specimen Weight                               | 50 lbs   | 100 lbs  | 200 lbs  | 550 lbs   |
| Maximum Specimen Height                               | Unlimited  | Unlimited  | Unlimited  | Unlimited   |
| Maximum Specimen Size                                 | 15 in x<br>Unlimited   | 22 in x Unlimited  | 22 in x<br>Unlimited   | 30 in x Unlimited   |
| Velocity Change (standard)                            | 330 in/sec (no<br>load)<br>260 in/sec (30<br>lb load)  | -----<br>-----   | 400 in/sec (no<br>load)<br>285 in/sec (150<br>lb load)                                   | 330 in/sec (no<br>load)<br>260 in/sec (400 lb<br>load)                                |
| Velocity Change (air amplifier)                       | 600 in/sec (no<br>load)<br>500 in/sec (30<br>lb load)  | 600 in/sec (no<br>load)<br>500 in/sec (70 lb<br>load)                                    | 750 in/sec (no<br>load)<br>570 in/sec (150<br>lb load)                                   | 600 in/sec (no<br>load)<br>500 in/sec (400 lb<br>load)                                |
| Stroke  | 18 inch<br>maximum   | 18 inch<br>maximum   | 18 inch<br>maximum   | 21 inch maximum   |
| Cycling Rate  | 8 cycles per<br>minute   | 8 cycles per<br>minute   | 8 cycles per<br>minute   | 8 cycles per<br>minute  |
| Maximum Deviation of specimen<br>cg from table center | 1 inch   | 1 inch   | 1.5 inch   | 2 inch  |
| Base Weight   | 1700 lbs   | 1700 lbs   | 5000 lbs   | 5000 lbs  |
| Floor Space   | 32 in x 36 in  | 32 in x 36 in  | 45 in x 60 in  | 45 in x 60 in   |
| Utilities Required                                    | Plant air or<br>bottled<br>nitrogen 80-<br>120 psig<br>115V, Single<br>Phase, 50 or<br>60 Hz | Plant air or<br>bottled nitrogen<br>80-120 psig<br>115V, Single<br>Phase, 50 or 60<br>Hz | Plant air or<br>bottled nitrogen<br>80-120 psig<br>115V, Single<br>Phase, 50 or 60<br>Hz | Plant air or bottled<br>nitrogen 80-120<br>psig 115V, Single<br>Phase, 50 or 60<br>Hz |